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TWENTY YEARS IN ZAMBESIA.*

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I commenced my African ramblings in 1871. At that time the facilities for reaching the interior from the Cape Colony were very different from those which are now available, as there was only one short line of railway from Cape Town to the village of Wellington in existence in the whole country.

Landing at Algoa Bay on September 4th, I at once proceeded to the Diamond Fields by bullock waggon, a journey which occupied two months. At that time neither diamonds nor gold had any charm for me, as my only desire was to get away into the far interior; but as I found that it would be inadvisable to start on such a journey until the rainy season was over, I bought a waggon and oxen, and spent the intervening time in a trading trip through Griqualand, and down the northern bank of the Orange River as far as the country of Klas Lucas, a Namaqua or Koranna chief.

In April, 1872, accompanied by two young men of about my own age, Messrs. Dorehill and Sadleir, I set out for Matabeleland. We had one waggon and span of oxen between us, and, as our money had run short, were rather badly fitted out for a long journey in the way of stores and trading goods. However, we had heard that elephants were plentiful in Matabeleland, and, being young and hopeful, we thought that everything would come right when we got amongst the tuskers, as indeed it did. The route we followed was the old trade road which skirts the eastern edge of the Kalahari desert, passing through Kuruman and Molepololi, and from thence to Shoshong, in the country of the Bamangwato, who were then ruled over by Machin. This chief was as much disliked by the traders living in his country as the present

* Read at the Meeting of the Royal Geographical Society, February 13th, 1893. Map, p. 384.

ruler, Khama, is honoured and respected. At Sechele's town (Molepololi) we had met Mr. Frank Mandy, who was also on his way to Matabeleland, and who, having been there before, was personally acquainted with Lo Bengula* and his people; and we all travelled together as far as Bulawayo, which we at length reached in the end of August.

As Lo Bengula has of late years become such a well-known personality in Zambesia, and may become much better known in the near future, I may perhaps be pardoned for quoting the account I wrote of my first interview with him, now more than twenty years ago:—

"We found that owing to the scarcity of grass for cattle near the chief town, Lo Bengula had trekked away and built a temporary kraal near Amachi Mashlopay (white stones); so we too trekked straight across the country to where he was, getting there towards evening. Here we found Mr. G. A. Phillips, who had already been eight years in the country, trading and hunting, and he kindly gave us a goat to slaughter. The following morning Lo Bengula, king of the powerful tribe of the Matabele (or Amandebele, as they should be called), came down to our waggons. He is a man standing about 5 feet 10 or 11 inches, strongly and stoutly built, and even at that date was growing very fat. He was then dressed in a greasy shirt and dirty pair of trousers; but I am happy to say that he soon afterwards discarded European clothing, and now always appears in his own native dress, in which he looks what he is—the chief of a savage and barbarous people. After saying a few words to Mandy, whom he knew, and seemed pleased to see again, he asked who was the owner of the other waggon, and being told by Mr. Phillips, who acted as interpreter, that I was, he asked me what I had come to do. I said I had come to hunt elephants, upon which he burst out laughing, and said, 'Was it not steinbucks' (a diminutive species of antelope) 'that you came to hunt? Why, you're only a boy!' I replied that, although a boy, I nevertheless wished to hunt elephants, and asked his permission to do so, upon which he made some further disparaging remarks regarding my youthful appearance, and then rose to go without giving me any answer. He was attended by about fifty natives, who had all been squatting on the ground in a semicircle during the interview, but all of whom, immediately he rose to go, cried out 'How! how!' in a tone of intense surprise, as if some lovely apparition had burst upon their view; then, as he passed, they followed, crouching down, and crying out, 'Oh, thou prince of princes! thou black one! thou calf of the black cow! thou black elephant!'" etc., etc.

Finally Lo Bengula gave me permission to go and hunt wherever I pleased, as I was only a boy, and I took to the life so kindly that for

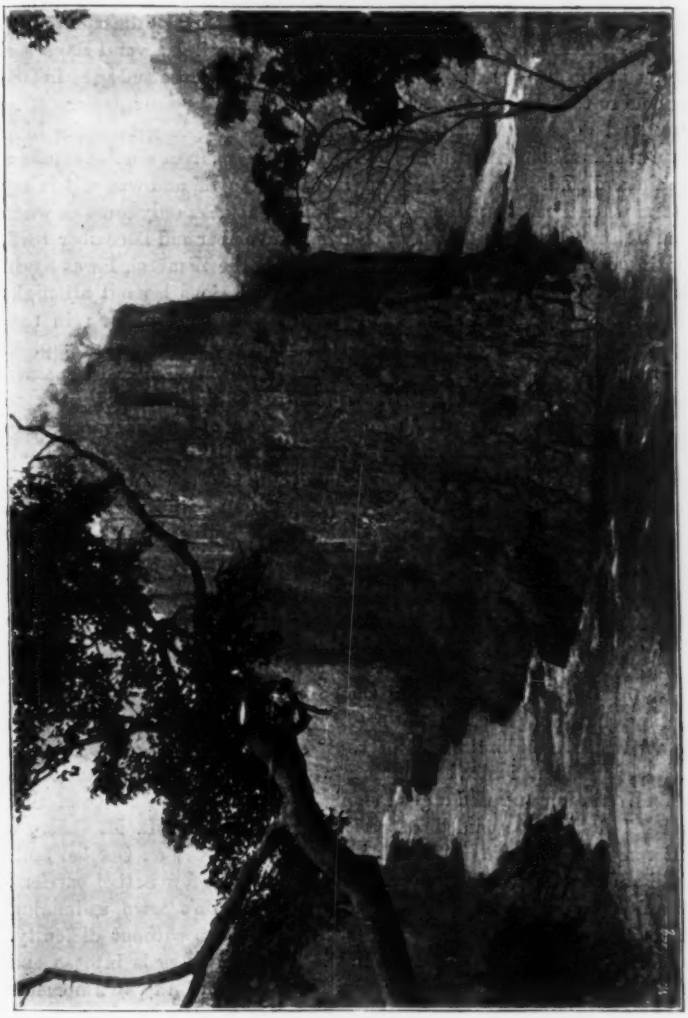
* The correct pronunciation is Lo Beng-úla, not "Ben-gula," as is common.

three years I remained in Zambesia, without ever experiencing the slightest desire to exchange my free wild life for the comforts and restraints of civilisation. During that period I travelled over a great deal of country; but, being always engaged in elephant hunting, which occupied all my time and attention, I am sorry to say that I did no surveying work whatever. The rainy seasons I spent in Matabeleland, not remaining in one place, but travelling about the country trading with the natives. In this way, during the rainy season of 1873, and again in 1874, I travelled all over the splendidly-watered plateau, in which the Nwanetsi, Lundi, and Tukwi Rivers take their rise, and went as far south as the junction of the Ingesi and Lundi Rivers not far from Mount Bufwa. Unfortunately, as I have said above, I made no sketch maps of these journeys; but they were not altogether useless, as it was my remembrance of the way in which George Wood and myself piloted our waggon through this country which enabled me sixteen years later to undertake, with an easy conscience, to guide the British South Africa Company's Pioneer Expedition to Mashonaland through this same country in 1890.

During the dry seasons—from May till November—of these three years, I travelled and hunted always on foot, with a few native carriers, all over the country between Matabeleland and the Zambesi, as far eastwards as the Sanyati River, and westwards to the Victoria Falls, and up the Chobe or Kwando River as far as the Sunta outlet.

In 1874 I found a lot of Masubias, refugees from the tyranny of Sipopo, chief of the Barotsi tribe, living on islands in the marshes of the Chobe, and in a very miserable condition, as, having fled from their homes without being able to carry any food with them, they were reduced to all kinds of shifts to save themselves from starvation. I found them living principally upon fish and a kind of meal made by pounding up the dried roots of a water plant. They were also eating a kind of food which looked exactly like sawdust. This, I found, was made from the roots of the palm tree, which are first roasted under the ashes of a fire and then hammered, when this substance falls out between the fibres. They said it was very good, and I took their word for it, but did not try it. I became very friendly with these people, and spent some months amongst them; and as during that time I shot twenty-four elephants, besides other large animals, every ounce of every one of which they used as food, I think I may say that I was a welcome visitor. I was the first white man any of the women and children had ever seen, though some of the men said they had seen Dr. Livingstone in Sekeletu's time. It was during the dry season of 1874 that I first noticed that the waters of the Chobe were rising instead of falling, although every day the weather was getting hotter and hotter. I noticed this phenomenon more carefully in subsequent years, and will refer to it later on.

VIEW ON THE ZAMBESI ABOVE THE VICTORIA FALLS.



VIEW ON THE ZAMBESI BELOW THE VICTORIA FALLS.

In 1875 I returned to England, going back to South Africa again early the following year.

As the health of Zambesia is just now a much-discussed question, I will here say a few words on the subject, giving my own experiences during three years of continuous residence in all parts of the country.

Owing to severe exposure to wet and cold during several days and nights, in the early part of 1872, I got an attack of fever and ague in Griqualand so that I was handicapped before starting for the interior. This fever and ague was exactly what I have seen people get on the high plateau of Mashonaland, during the last few years, from similar exposure to rain and cold. It took me some time to shake off, and was still in my system when I reached Matabeleland, but the attacks only came on when I halted anywhere for a few days. During November and December 1872, hunting down in the low hot country towards the Zambesi, I was again very much exposed to wet, and on several occasions lay out all night long, without any shelter, drenched through with such heavy rain that it put out the largest fire and converted hard ground into a swamp. I naturally again got soaked with fever poison, but as long as I remained hunting the disease did not show itself. Directly I got back to Bulawayo it broke out, and during a month or so I had several sharp attacks. By that time, however, my sound constitution had choked all the fever germs, and from that day until in 1878, when very severe exposure in Central Africa once more filled me up with malarial poison, I do not remember ever to have had one single hour's illness or to have taken one drop of medicine. The life I led was, however, if a very hard, at any rate, in many respects, a very healthy one; for the most part I ate nothing but meat and Mashona rice, and drank nothing but tea, usually without milk and sugar, not because I like it so, but because those adjuncts were unobtainable.

In 1877 I again visited the Chobe and Zambesi Rivers, elephant hunting, but had a very bad season, as we could not come across elephants; so towards the end of the year I sent my waggons back to Matabeleland, but instead of going with them resolved to cross the Zambesi and try and find a good elephant country to the north of that river. I was accompanied on this journey by Mr. L. M. Owen, a gentleman well known in South Africa. We started on October 30th from Pandamatenka, with four pack-donkeys and a few native carriers, and a few days later crossed the Zambesi at Wankie's town, swimming the donkeys through the river at the tail of a canoe without difficulty. At this time of the year the heat in the Zambesi valley is intense and very enervating and oppressive. On November 3rd the thermometer marked 87° at day dawn, the coolest time in the twenty-four hours: and at midday in the shade of very thick foliaged trees, with a breeze blowing beneath, it ranged from 103° to 110° as long as we were on the river.

As I thought that elephants were sure to be plentiful in the neighbourhood of the Kafukwe and Loangwa Rivers, and also in the country between those rivers, I determined first of all to follow the course of the Zambesi as far as the mouth of the Kafukwe before leaving the former river. Where we crossed the Zambesi the people belong to the Manansa tribe, and are an offshoot of the Makalakas. These people are mild and peaceable in disposition, and friendly to travellers. Formerly they inhabited a large tract of country to the south of the Zambesi, and to the westward of the River Gwai, from which they were driven with great slaughter by the Matabele.

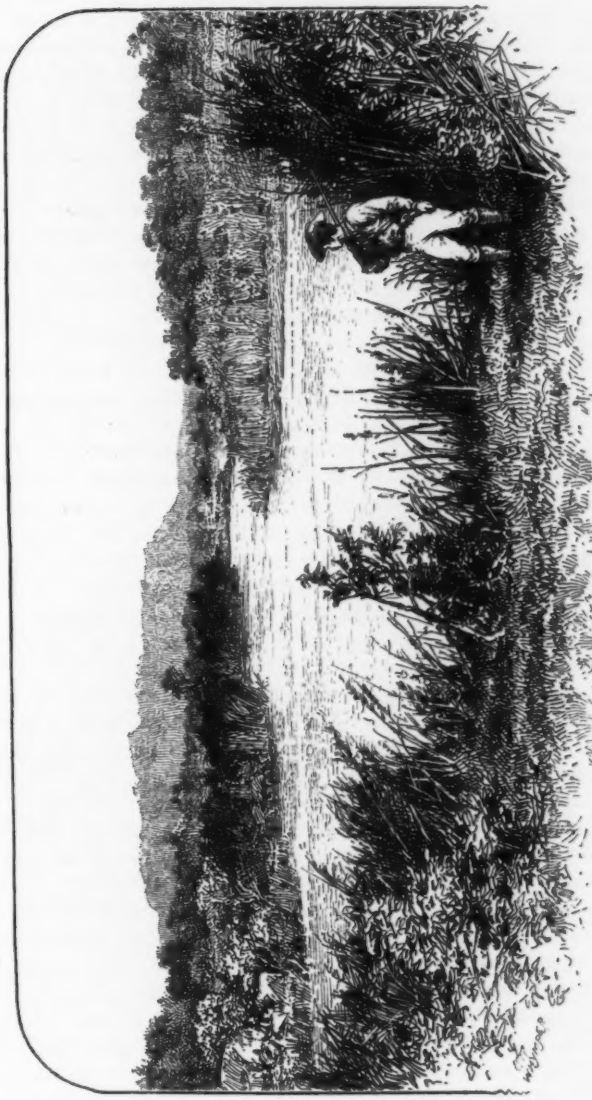
On the second day after leaving Wankie's village we got amongst the Batongas, a people who now have an evil reputation, and which is well deserved. At the time of our visit to them, however, in 1877, no white man had travelled amongst them since Dr. Livingstone, Charles Livingstone and Dr. Kirk passed through their country in 1861, so that we were still something strange and new to them, and the awe with which we inspired them overcame their innate rascality. They gave us no trouble whatever, and indeed, were very civil, the headman of almost every village we passed through presenting us with a goat, for which, of course, he always got a "quid pro quo." Both banks of this part of the Zambesi seemed very thickly populated by these people, their villages being very close together, with almost all the intermediate ground cleared for cultivation. In every village stood a large dovecot, whose inmates kept up an incessant cooing. This peaceful state of things, however, did not last long, as beyond the River Chaisa fighting had recently been going on between Kanyemba, the Capitão Mor of Zumbo, and the Batongas, and as Kanyemba's men were well armed with guns, and the Batongas had only assegais, the latter had got very much the worst of it. We passed many villages from which the owners had been driven, and their huts and corn bins burnt. At one place we passed the remains of a man and woman lying on the footpath. Many people must have been killed, as the stench was often offensive, though the bodies had been dragged into the neighbouring bush by the hyænas.

Just at sundown one evening about fifty Batongas came down to our camp near the site of a burnt village, each of them carrying from four to eight assegais. They seemed very friendly when they heard we were Amangees (English). The Enduna told us that all their towns and corn bins had been burnt, they themselves shot down, and their women and children carried off into slavery by the Shakundas. They now were living in the bush with the remnants of their belongings. This man gave us two goats, saying he was very pleased to see Englishmen, as he had heard they did not trouble people. At one place we met a Batonga army of about three hundred men who were going to attack a half-caste Portuguese trader, named Monteiro, who was living on a large island in the Zambesi with a strong following of Shakundas. At

this juncture all our carriers threw down their loads and bolted, so that we were obliged to get men from the Batongas to carry our things, and had to accompany them to near Monteiro's camp. That night the Batonga army was encamped all round us, but they were very orderly, and gave us no trouble whatever. During the night the Shakundas on the island beat their war drum, and bade defiance to their enemies, who only listened in sullen silence. The next morning five of our own men (three of whom themselves were Batongas) returned, but the men we had hired at Wankie's never turned up again. The following morning more Batongas kept coming in, all decked out in war costume. Some of them were, with their large feather head-dresses, as ferocious-looking savages as I have seen, and except for the head-dresses about half of them were perfectly stark naked. There was only one gun, an old flint-lock, in the entire Batonga army; but they were very rich in assegais, none carrying less than four, and many of them as many as eight of these weapons. No fight, however, took place, as each party was apparently afraid to attack the other, and at last an arrangement was come to and the Batongas retired, their Enduna supplying me with seven carriers in place of those that had run away. At length after many delays we reached, on November 24th, the narrow gorge of Kariba, where the mighty Zambesi, which just above is a great river over half a mile in breadth, has worn for itself a deep narrow channel in the hard rock, through which it rushes at a terrific pace in a series of whirlpools and eddies. I went a long way down this gorge and examined it carefully, and in many places it cannot be more than 60 yards in width, as I balanced myself on the rocks on one side and threw stones right across. From the high-water marks I should think that when in flood the Zambesi must here rise quite 20 feet above its level when I saw it, and its breadth would then be over 200 yards. The Sanyati empties itself into the Zambesi from the south, just at the entrance of Kariba gorge. Its bed is one mass of huge boulders of rock, and about 150 yards broad, but when I saw it, at the end of a very dry season, there was but a mere driblet of water running into the Zambesi, though I can easily understand that after heavy rains it may be transformed into a roaring torrent.

To avoid the hills of Kariba we took a path which passed at the back of them, through dry, desolate-looking, Mopani forests. The only water we saw we obtained at the bottom of a deep well that had been dug by some natives near their village. On the following day we again struck the Zambesi at Nyampunga. In no part of the great river that I have visited—and I have followed its course for several hundred miles altogether—have I seen as many hippopotami as there are in the reaches beyond Nyampunga. We often saw two or three large herds, of from fifteen to twenty animals in each, in the course of a mile.

On November 28th we crossed the Losito River, and soon afterwards



LUNDI RIVER, LOOKING EAST.

reached Nyaukwe. This place had lately been the headquarters of some Portuguese or half-caste traders, and the remains of eight square huts, with verandahs round them, were still standing. Shortly before our arrival, in the absence of most of the male inhabitants who were with Kanyemba, Nyaukwe had been attacked by a party of Batongas, who had burnt down and destroyed most of the huts. The inhabitants had all managed to escape across the river in their canoes, and at the time of our visit were living in little straw makeshifts for huts on the white sand along the water's edge.

At this place we re-crossed the Zambesi to the southern side, and learned from the fugitives from Nyaukwe that there was a white man—a Portuguese—living on an island a few miles lower down the river. A little before sundown we got opposite the place, and Senhor Joaquim Mendonça sent a boat to bring us to his island. We here remained a fortnight, and during that time I went down with Mendonça to the mouth of the Kafukwe River on a visit to Kanyemba. At that time I believe that the slave trade was still legal in the Portuguese possessions, being only finally abolished on January 1st, 1878, so that we could not be surprised at the sight of slaves in chains. Unfortunately, so little power has the Portuguese Government to enforce its laws in the interior of South Eastern Africa, that in 1891 slavery was still being carried on on the central Zambesi by men holding the official title of Capitão Mor, very much as at the time of my first visit in 1877. Both during our first visit and on our return from the north a few months later, Mendonça treated us with the greatest kindness and hospitality. He was not a philanthropist, and apparently looked upon his life in Africa as a weary exile. He tersely summed up his ideas concerning the natives and the country in a sentence which he often repeated to me: "negro diablo; Africa inferno"—(a black man is a devil; Africa is Hell). He had, however, many good qualities, but the evil surroundings amongst which he had lived, had exercised a deteriorating influence upon him. Whilst we were at Kassoko (the name of the island on which Mendonça lived) we met with a great misfortune, for three out of our four donkeys were killed by hyenas, and the fourth so torn as to be rendered useless for work. They were not on the island with us, but in a camp on the northern bank of the river in charge of my Basuto servant, and two Batongas. We were now reduced to five boys to carry our baggage. However, we had little baggage to carry. All our provisions were finished, and Mendonça had nothing to sell us, so that from this time forth, until we reached Matabeleland in the following May, we had nothing in the way of food but what we shot, and what we could buy from the natives, and nothing but water to drink. As we learned from Mendonça that elephants were plentiful on the Upper Kafukwe, I determined to set out there at once. Some natives that were consulted said we had best first cross the Manica plateau (not to

be confounded with the Manica country, in South Eastern Africa) to Sitanda's, the head chief of that district, and then get men from him to show us where the elephants were. The rainy season was just setting in—and it proved one of exceptional severity—we had neither tent nor waterproof, and only the most meagre outfit in the way of blankets and clothing, very little medicine, and nothing in the way of food but what we got from day to day. As long as we kept our health, however, everything went well. I shot game, and with the meat we bought whatever food the natives had to sell. But when we were all down with fever, and I could no longer shoot, we were very nearly starved, and altogether had such a bad time of it that we only just managed to live through that rainy season in Central Africa.

On December 13th we left Kassoko, Mendonça having supplemented our own five boys with four Shakundas who were to act as guides as far as Sitanda's. We crossed the Zambesi just below its junction with the Kafukwe, and at once made for the range of mountains which here runs parallel with the course of the Kafukwe and Zambesi Rivers, and beyond which lies the plateau of Manica. As a great deal of rain was now falling day and night, it was not until the fourth day after leaving the Zambesi valley that we at length emerged from the hills and stepped on to the table-land beyond; great open plains, or rather rolling downs, intersected by ranges of low hills, for all the world like portions of the Mashona country south of the Zambesi. I think we must have ascended quite 3000 feet above the level of the Zambesi. The temperature was delightfully pleasant, and quite fresh and cool after the sultry heat we had experienced since leaving Panda-matenka; the thermometer showed a difference of 20°. At the time of our visit to the Manica plateau the country looked charming. The young grass, thanks to the recent heavy rain, had shot up 1 foot or 18 inches in height over hill and dale, every tree and shrub was in full leaf, and everything looked green, and fresh, and smiling. Many of the shrubs on the edge of the hills bore sweet-smelling flowers, and, as on all the plateaus of the interior of Africa, small but beautiful ground-flowers were very abundant.

After reaching the plateau we travelled to the north-west, crossing the heads of the Mai-yuni and Chongwe Rivers, which flow first northwards, then eastwards, and finally southwards into the Zambesi. On January 1st, 1878, we reached a rivulet called Kalolo, which ran to the south-west towards the Kafukwe, and from this point to Sitanda's village we travelled nearly due north. The country near Sitanda's is no longer open, but consists of patches of open forest alternating with grassy valleys. Just beyond the village there is a large river or swamp, which the natives said it would take more than a day to cross. As, however, rain had been falling unceasingly for more than a month, almost every valley in the country was flooded. In these swamps of the Lukanga,

large herds of the graceful Lechwe antelopes were to be seen in all directions, standing up to their bellies in water, on the flooded land.

During our journey from the Zambesi to the Lukanga we had suffered much from exposure to the unceasing rain, and directly we halted my companion was laid up with fever. Then Franz, my Basuto servant, got an attack. At this time the struggle for existence was very severe, as there was a famine in Sitanda's country, and the people would only sell corn for meat. The only game to be got were Lechwe antelopes, in the swamps of the Lukanga, and I think it was the continual wading under a tropical sun that at last gave me fever too. Luckily I had laid up a good supply of corn before falling ill. When we were all ill Sitanda became most inhospitable, and, no doubt, was very much disappointed that we did not die and enable him to become our residuary legatee. The only thing for us now to do was to get back to the Zambesi. As soon as I shook off the fever I began to get strong again, and so also did Franz, but Mr. Owen remained in a very weak condition, and could only travel very slowly, and, as we only had a little calico left with which to buy food, and knew that when that was done we should starve to death, I at last took three of our five boys and pushed on to the Zambesi in order to send assistance back to my companion, with whom I left almost all the calico.

On February 19th I reached Mendonça's island, Kassoko, and was very kindly received, and on the following day sent assistance to my companion, who finally rejoined me on March 5th.

On March 21st, Mr. Owen seeming much stronger, we started for Matabeleland, intending to cross the Zambesi to the west of Kariba, and then strike due south, through an entirely unknown and pathless country. Soon after leaving Kassoko Mr. Owen got a bad relapse, and became so weak that he could not walk a step. I then made a kind of hammock of bark, and slung it on a pole, and, having obtained a supply of calico and powder from Mendonça, hired some Banyai to carry him. On April 4th we recrossed the Zambesi to the southern side. The daily worry and trouble I had to get the men to carry my companion can never be understood by anyone who has not had a similar experience. The anxiety of mind and want of sleep soon brought on fever; and though at first I only got an attack every second day, I presently had ague and fever every day, but was forced to walk on in the hot sun with the fever on me. Add to this, that we were travelling through a pathless country, and that, being the end of the rainy season, the vegetation was at its rankest, and I do not know how the journey could have been rendered more arduous.

At last, on April 15th, we reached a Banyai town on the Gweo, a tributary of the River Umay; and further than this the men from the Zambesi would not carry my companion; and as he could not walk a step, we were in a mess. We had only five boys, three of them mere

striplings, and, worst of all, but two and a half pieces of calico left. I myself was very weak and ill. Bad and insufficient food, overfatigue, and worry of mind had worn me out. There was but one thing to do, which was for me to push on to the Matabele country, and send help back as quickly as possible. In my weak state I almost despaired of being able to walk so far; but it was the only chance, for there was nothing left with which to pay men to carry Mr. Owen any further, and we were still a long, long way from the Matabele country. Arrangements were soon made. I left Franz, my Basuto servant, and a small boy, to carry wood and water, and took the other five Kafirs with me. I took nine yards of calico, leaving the two whole pieces and all the beads with Mr. Owen, which was a sufficient supply to enable him, with a little economy, to buy food enough to last at least six weeks, by which time, if I lived, help would have reached him from Matabeleland.

On April 17th I parted with Mr. Owen, and on May 4th reached Emhlangen, in Matabeleland, after a dreadful journey. In Matabeleland I was once more amongst my friends and countrymen, the missionaries and traders. A party was at once organised, and sent to Mr. Owen's assistance, and he eventually reached Bulawayo in better health than when I left him, as he had enjoyed a long rest.

By the following July I had quite recovered my health, and early in August started on an elephant-hunting expedition to northern Mashonaland, where I remained until the end of the year. On returning from this expedition, we (George Wood, Alfred Cross, Matthew Clarkson, and myself) cut a new road from the Umfuli to the Sebakwe River, as the old hunting-road to the north of the Machabi range of hills had become impracticable for waggons. Our new road traversed a beautiful stretch of high-lying, open, and well-watered country between the Machabi and Intaba Insimbi ranges of hills, and after this date, and prior to 1890, was the road always followed by hunters and travellers visiting Mashonaland.

In 1879 I travelled and hunted all over the country between the Mababi, Machabi, and Chobe (or Kwando) Rivers as far as Mai-ini's, where the river divides into two main branches, between which is a large island full of swamps and lagoons, where, at the time of our visit, game was very plentiful, especially buffaloes and Lechwe antelopes. In travelling to the Mababi River I took the desert road from Khama's capital, Shoshong, and our unfortunate cattle suffered much from want of water; in fact, our expedition narrowly escaped total destruction from thirst, for, on the last stage of the journey, the oxen had to pull the heavy waggons from the pool of Sode-Garra to the Mababi River—a distance of 120 miles—without a drink or a rest.

Mr. Arnot has described his journey over this same road three years later as a very arduous one; but he then found water in many places which were dry in 1879. During this year I crossed the Quando, and

visited the site of Linyanti, the chief town of the Makololo chief, Sebituane, who was visited by Livingstone and Oswell in 1852. At that time Sebituane was lord over a vast extent of country, and his warriors had conquered the Barotsi, on the Upper Zambesi, and devastated the whole of the high plateau lying between that river and the Kafukwe. At length Sebituane died, and his son, Sekeletu, became king in his stead. He also was the friend of Livingstone, by whom he was visited for the last time in 1861. When Sekeletu died, the Makololo empire fell to pieces. There was a civil war between two rival claimants for the chieftainship; and then the subject tribes rose upon their conquerors, and, led by Sipopo, a descendant of the old Barotsi chiefs who had ruled in the land before the Makololo invasion, utterly annihilated the remnant of the conquering race. Every male child was slain, but the females were taken as wives; so that there is a strong strain of Makololo blood amongst the present Barotsi people. Two small parties of Makololo warriors escaped the general slaughter, and fled across the Kwando. One of these parties made their way to, and craved protection from, Lechulatebe, the chief of the Batawani, at Lake N'gami, by whom they were treacherously murdered to a man. The second party went to Matabeleland, and were well received by Umziligazi, who gave them cattle and land to live upon; so that they throve and prospered, and their descendants are living in the country to the present day. At the time of our visit to Linyanti nothing remained to show its former prosperity but the site of an old native town. Where fifteen years previously cattle had grazed, and human beings had tilled the soil, we found great herds of buffaloes and Lechwe antelopes; and in all the land, to use a native expression, "there were no lords but the lions." With the buffaloes had come the tse-tse fly, and we found these insects very numerous in the district. We visited the graves of Sebituane and Sekeletu, and our Kafirs made offerings, and prayed to the spirits of these departed chiefs. Their pale ghosts, however, frowned upon us, for not only did we not see many elephants, which we had prayed to be put in the way of seeing, but my unfortunate friend Mr. French lost himself, and died of thirst in the desert country between the Chobe and the Zambesi. At Linyanti we found the tires and nave-bands of a waggon that had long since crumbled to decay. This waggon may have belonged to Dr. Livingstone, or to the unfortunate mission party who, with their wives and children, all died here in 1861, with the exception of Mr. Price and two of Mr. Helmore's children.

During this year I noticed more particularly than in 1874 the curious phenomenon of the steady rise of the waters of the Chobe and Machabi—an outlet of the Okavango—from the first week in June until the last week in September, when they commenced to recede. That the Okavango and the Upper Kwando are connected on their upper courses, I think there can be no doubt, as the waters of the Machabi

went on rising steadily *pari passu* with the Chobe, until the end of September, when both commenced to recede simultaneously.

What is the explanation of this remarkable phenomenon I am still at a loss to conceive, as there are no snow mountains at the sources of the Kwando and Okavango Rivers, and the Zambesi, which rises in the same latitude, decreases steadily in volume from day to day during the dry season like all other rivers with which I am acquainted in South Central Africa. Besides the channels which still become annually filled with water from the overflow of the Chobe and Okavango river systems, there are many others which are now quite dry, but in which the natives say they once used to travel in canoes. Further to the south-east too, in the country between the Gowai and Nata Rivers, there are old river-beds, some of which are quite dry, whilst in others pools of water may still be found; and where such pools exist they are either permanent, or water may be obtained by digging when they are dry, which seems to show that water still runs in these ancient river-beds below the surface.

In the following year, 1880, I again visited Mashonaland on a hunting expedition in company with Mr. J. S. Jameson, who recently lost his life under such very sad circumstances, when left behind on the Congo during the progress of the Emin Relief Expedition. Poor Jameson and I lived together for a year in the wilderness, and I have never yet met a more lovable man. He was a very keen sportsman, and full of life and spirits, and being both gentle and brave, was a universal favourite, not only with all sorts and conditions of white men, whether Boer hunters or English traders, but also with the natives, from Lo Bengula downwards. During the year we traced the course of the Umfuli River to its junction with the Sanyati, proving conclusively that it did not run into the Zambesi independently, as represented on all the maps published up to this date.

In 1881 I returned to England for the second time.

In 1882 I again revisited Mashonaland. At that time the topographical features of a very large area of what we now call Mashonaland were entirely unknown to geographers. The well-known and painstaking traveller, Mr. Thomas Baines, had never penetrated beyond the River Manyami (or Hanyani), and although my friends, Messrs. George Westbeech and G. A. Phillips had accompanied a Matabeli impi to the sources of the Mazoe in 1868, they had not plotted their route, or published any notes of their journey. Farther south Herr Karl Mauch, the indefatigable German traveller and mineralogist, after discovering the ancient temple of Zimbabwe (Zimbab-ghi), had made a most notable journey past Mount Wedza, near the head waters of the Sabi, and from thence, passing through Mangwendi's country and down the valley of the Ruenya (or Inyangombi River) had reached the Lower Zambesi at Sena. Still this was a single journey, and the country on each side of Mauch's

route was very incorrectly laid down in the best maps. During 1882, 1883, 1885, 1887, 1889, 1890, 1891 and 1892 I have been constantly travelling over almost every portion of the Mashona plateau, and during that time have been constantly mapping out the country in a rough way by taking compass bearings wherever possible from hill to hill, and by sketching the courses of the innumerable rivers and streams from the tops of the hills. This work can be done much better during the rainy season than at any other time, as after the first grass fires the air becomes so thick that it is impossible to take compass bearings. During 1882 I made a journey from the plateau to the Zambesi, first following the line of the Umvukwe hills to the north, and then working down the valley of the Umsengaisi River. After striking the Zambesi, I followed its course westwards to Zumbo, and found that the Panyami River flows into the Zambesi some 15 miles east of Zumbo, instead of to the west of that place as it was always marked in the maps previous to the time of my visit. I returned to the plateau by the valleys of the Panyami and Angwa Rivers. In 1889 I penetrated to the plateau from Tete on the Zambesi, and during this journey I traced the Mazoe River to its source, which I found to be very far from where it was laid down in the maps. In 1891 I made a journey down the Revue to near its junction with the Buzi, and a few months later crossed the former river near Vumbi's town, and examined the country between the Pungwe and Buzi Rivers in order to try and find a route for a waggon road to the lower Pungwe, which would be free from tse-tse fly. In this I was unsuccessful, as I found all the low-lying country infested with this destructive insect.

I have now briefly referred to some of my journeys from the high plateau of Mashonaland to the countries which surround it to the north-east and south; but my ramblings over the plateau itself have been so numerous and ubiquitous, extending as they do over the greater portion of eight years (during the whole of which time I was continually on the move, and seldom slept twice in the same place), that it would be impossible for me to give any detailed account of them. My map, when published, will speak for itself, and show that I have made a careful survey of a large area of country. I have climbed almost every hill, and taken hundreds of compass bearings, sketching-in the courses of the rivers and streams from the tops of the hills. Besides an intimate knowledge of the geographical features of the country, I have learned, too, something of the history of the native races by whom it is inhabited; and I have visited the ancient temple of Zimbabghi, and carefully examined many of the walled towns in the territories of Makoni and Mangwendi. I have my ideas, too, as to the suitability of the climate of Mashonaland for Europeans, the general capabilities of the country, and its future possibilities, and on all these matters I will now proceed to say a few words.

To begin with, the name Mashonaland is a coined word, and how it became current I have never been able to discover. The native inhabitants of this part of Africa belong to many different clans, some of which are probably the remnants of once powerful tribes. Each sept has its own tribal name and tribal marks, and the territory of each is fairly well defined. Thus, Motoko's people are Mabuja; Makoni's tribe Ma-ongwe; Umtasa's, Mabocha; Mangwendi's, Muzizuru, etc. I have never, however, met with any clan whose members called themselves Mashonas; and the name is altogether unknown amongst the natives of this part of Africa, except to a few who have learnt the word from Europeans. As a generic term, however, the word is useful, and may be taken to designate all the tribes of South-Eastern Africa that are not of Zulu blood. These tribes, it may be remarked, all speak dialects differing very slightly one from another, and all of them quite comprehensible to the Makalakas living to the west and south-west of Matabeleland. In speaking of Mashonas and Mashonaland, I may mention that in an article written by me, and published in the *Fortnightly Review* for May, 1889, I expressed the same views concerning the origin of these words which I now repeat. In his paper, published in your *Proceedings* in the May number for 1892, Mr. Bent refers to this subject, and has an uncomplimentary remark about "certain pioneers with their usual perversity," etc., giving wrong names. I believe he had no knowledge of any native dialect, and had only spent a few weeks in the country, while some of the pioneers to whom he refers had spent years. He tells us that all the inhabitants of Mashonaland call themselves Makalanga, and that the country ought to be called Makalanga Land. In support of his contention he adduces the fact that four hundred years earlier Dos Santos found a people called Mokarangas in South-Eastern Africa.

Very likely, but Dos Santos never travelled in the country to the west of the Sabi, where Mr. Bent avers all the people now call themselves Makalangas, and where Dos Santos did travel there are certainly no Mokaranga, Makalanga, or Bakalanga. Possibly the Bakalanga, whom Mr. Theal found living in Basutoland during the present century, are the descendants of the Mokaranga, amongst whom Dos Santos travelled four centuries ago. The explanation of Mr. Bent's mistake is very simple. He had a Matabele boy who acted as interpreter between his white interpreter and the Mashonas. This Matabele called all septs of Mashonas Makalanga, using the word to denote an inferior people. Mr. Bent, too, tells us that Makalanga means people of the sun. Originally no doubt it did, but in the mouth of a Matabele I do not think it has that meaning, it being the Zulu corruption of the word Makalaka, as the people living to the west of Matabeleland call themselves. The Matabele call these people Ama Kalanga, and I know of no other people *who call themselves* either Makalaka or Makalanga. I

may be wrong, but this is not only my opinion, but also that of Fathers Prestige and Hartmann (S.J.) who speak the Mashona dialect, and have made many inquiries amongst the natives on the subject.

There being a considerable amount of uncertainty as to the number of tribes that may legitimately be classed under the generic term of Mashonas, there is naturally some doubt as to the actual extent of the territory that ought to be called Mashonaland. In former days we used to speak of the whole of the plateau to the east, north-east and south-east of Matabeleland as Mashonaland; but a name is wanted which will include Matabeleland and Manicaland, and in fact take in the whole of the British South Africa Company's territories. Zambesia and Rhodesia are the only two names that I have heard suggested, and the latter, which has been given out of compliment to Mr. Cecil Rhodes, to whom alone it is due, that what may soon become a rich and prosperous territory has been added to the British dominions (practically I think it is so), seems to be steadily gaining ground in popular favour; as the two papers published in Mashonaland are called respectively the *Rhodesia Herald* and the *Rhodesia Chronicle.*

People who hurry through the country, and especially those who do not go beyond Salisbury, have but little idea of the extent of the high plateau of Mashonaland. Stretching away to the east and south-east of the main road between Salisbury and Umtali, there is a very fine tract of country, which is but very little known. In this direction I have travelled a good deal, and made a careful survey, a glance at which will show how magnificently watered is this part of the country. Portions of this district, especially in the neighbourhood of the sources of the Rusapi River, and its numerous tributaries, are remarkable for the abundance of huge naked masses of granite, which rise abruptly from the grassy downs. Some of these, though formed of a single block of stone, are worthy to be called hills; notably the huge cone, named Dombo, which, standing as it does, on the extreme eastern edge of Mashonaland, commands a truly magnificent panoramic view over an immense extent of country; for the plateau itself, on the edge of which Dombo stands, here attains a height of 6000 feet; and whoever climbs this naked crag will stand 6700 feet above the sea, perhaps the highest point in South-eastern Africa; for I doubt much whether the loftiest hills in Manica attain a height of 7000 feet.

It was in February 1891, during the height of the rainy season, that after two attempts, rendered unsuccessful by blinding storms of rain (during one of which my companion, Mr. W. L. Armstrong, was nearly washed down a fissure in the mountain side), we stood at last, compass in hand, on the summit of Dombo. Well indeed were we repaid for our perseverance. The air, freed by months of rain from the smoke of the winter grass fires, was extraordinarily clear, and enabled us to see, at one and the same time, several of the most conspicuous hills in Mashonaland;

the peaks of Wedza far in the west; the great table mountain of Inyarugwe, away down in Maranka's country, near the Sabi River; the granite cone of Temwa, which stands far to the north-east, near Motoko's stronghold; besides Mount Anwa, beyond the sources of the Masheke, and many another well-known hill. Stretching away to the north-east lay the great mountain range of Inyama, culminating in a conspicuous peak, which may, possibly, be the Mount Bismarck of Mauch; while to the south lay a wilderness of rugged mountains, which form a portion of the wild and beautiful land of Manica. Amidst the gorges of these mountains two important rivers take their rise: the swift and impetuous Odzi, one of the main tributaries of the Sabi, and the equally swift, and much more important river, the Ruenya, loved of hippopotami, which, after receiving the waters of almost every river in Eastern Mashonaland, south of the Umvukwe range of hills, pours the impetuous waters of a mountain torrent, clear and cool to the very end of its career, into the giant Zambesi. The upper course of the Ruenya is called the Imyang-ombi (Yankombe of Mauch), and from the top of Dombo it may be seen for many miles, winding like a silver thread (by-the-bye, I think I have heard that simile before) down the valley, running parallel with the Inyama Mountains.

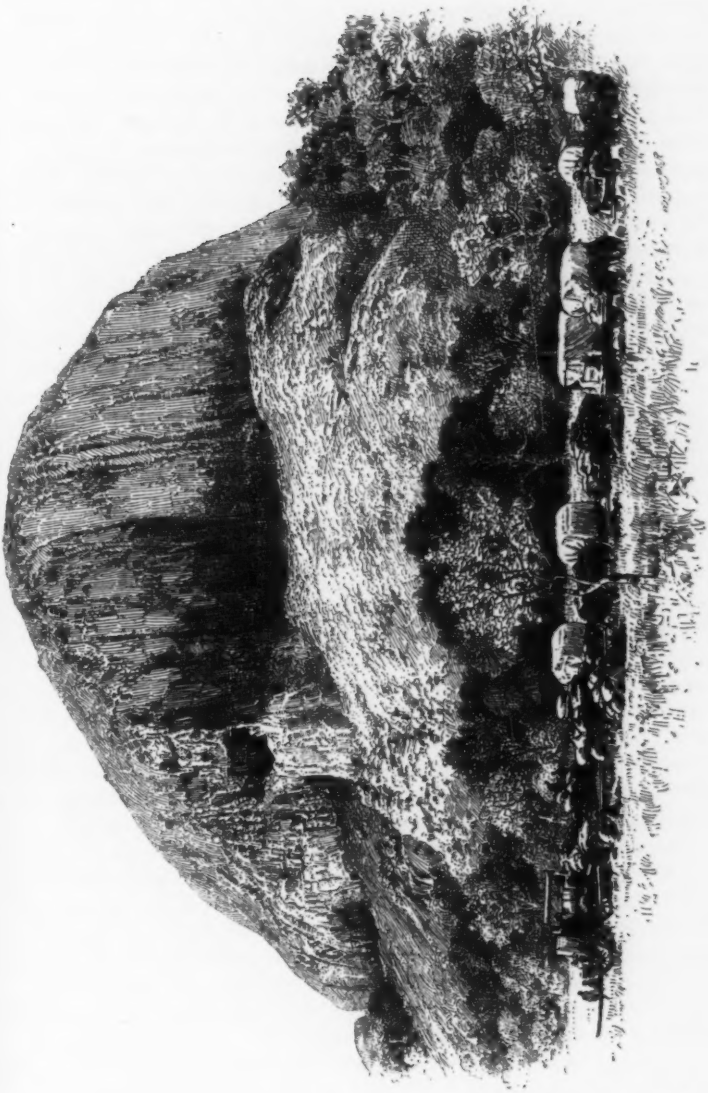
Although Dombo, viewed from a distance, looks like a uniformly smooth-rounded cone of granite 700 feet in height, a close inspection shows that in places deep furrows have been worn in its sides by the action of rain. This phenomenon may be seen in many of the higher granite crags of Mashonaland, but nowhere to such perfection as on the western face of a large isolated hill called Zomba, which stands near the head waters of the little River Inyazuri. This hill stands within half a mile of the main road, between Fort Salisbury and Manica, and cannot fail to attract the attention of any passers-by for whom the operations of nature have any interest. The centre of the western face of the solid granite rock has been scored and furrowed in such a way, that it presents the appearance of a water-worn glacier, and the depth of the furrows must be measured not by inches, but by feet and yards. Now imagine what this means. This hill is a bare granite crag, perfectly isolated, and the only possible agency that can have scored its sides is rain. Yet the effect produced by the showers, which actually fall upon it, during ten years, or even a century's wet seasons, must be so infinitely small, that countless eons of time must have elapsed since this old rock first bared its face to wind and storm.

Judged by our calculation of time, what a very old world this planet must be, for all this erosion of hard rock by rain must have occurred subsequently to the last elevation of this portion of the Earth's crust, as except on the supposition that all this part of Africa was once submerged, I cannot understand how the curious kopjes of wonderfully-balanced granite stones, which are so remarkable a feature in the landscapes of

many portions of South-Eastern Africa, can have been formed. As the land slowly rose, I take it that the soil was washed by the water from amongst the huge loose boulders which had previously drifted together, leaving them at last high and dry, and piled one upon another in the most fantastic confusion. Other single blocks weighing hundreds of tons may be seen standing singly on the slope of a granite hill, and can only have been brought there by water, just as blocks of stone have been left stranded in various parts of Europe by ancient glaciers, which have long since disappeared. I think I have read somewhere that Africa is geologically a very old continent, and I think that the rain-worn furrows in the granite rocks I have above alluded to are a proof that it is so; and what is more, the hippopotamus paths worn deep into the solid rock along the lower Umfuli River—paths formed in the hard stone with the central ridge plainly shown, as in a hippopotamus path made but yesterday in muddy ground—prove that the mammals existing in it at the present day have roamed the land for countless ages.

As regards the native races inhabiting Mashonaland at the present day, they seem to be much the same as they were in the time of Dos Santos four centuries ago. They belong to the Bantu family, which is spread over the whole of south-eastern and south-central Africa; but what the Bantus are ethnologically, who can say? They are certainly not a pure race, though the negro blood predominates in them. The infusion of foreign blood which undoubtedly runs in their veins must have come from a lighter-skinned people, I fancy, for I have noticed that in all tribes of Kafirs, amongst whom I have travelled, good features, thin lips, and well-shaped heads, are almost invariably correlated with a light-coloured skin. Now I will here hazard a theory which may or may not have any foundation in fact. I will first, however, assume that Mr. Bent is correct in the supposition that the original builders of Zimbabwe came from southern Arabia. Dr. Schlichter, in a criticism upon Mr. Bent's lately published book, 'The Ruined Cities of Mashonaland,' proves conclusively that during the six centuries which elapsed between the founding of the Christian religion and the birth of Mohammed there was no intercourse between the natives of Southern Arabia and South-eastern Africa, so that we must put back to a very remote period the first incursion of the worshippers of Baal into the country we now call Mashonaland. That the builders of Zimbabwe were a very rude people possessing no written characters and doing all their building by eye and without measurement, is, I think, abundantly evident from an examination of the ruins themselves.

Well, we will suppose that two or perhaps three thousand years ago a commercial people penetrated from Southern Arabia to Mashonaland. They were acquainted with the requirements of the civilised nations of Asia at that period and understood the value of gold. This metal



A KOPJE.

they discovered amongst the hills and in the streams of Mashonaland. In time these Arabian merchants gained a footing in the land and taught the black aborigines to mine for them. Their principal station was at Zimbabwe, where they built, with the forced labour of the aborigines, a temple for the worship of Baal, and a strongly-built and well-situated fortress. But I take it, that, like the Arabs in Central Africa at the present day, these ancient Arabians brought few or no women with them, but took a very handsome allowance of wives from amongst the aboriginal blacks. For a long period intercourse was kept up with Arabia, and during this period the gold-seekers spread over the whole of South-eastern Africa from the Zambesi to the Limpopo, everywhere mixing with the people, and teaching them their own rude arts of wall-building and gold-mining. In course of time, we will suppose, that events happened in Arabia which put an end to all intercourse with the distant colony in Mashonaland, and as time went on, as the alien race were still in small numbers, compared with the aboriginal blacks, and as they had none of their own women with them, they gradually became completely fused, and nationally lost amongst the aborigines. The mixed race called the Bantu had been formed, which spread in course of time northwards as far as the Congo, and southwards as far as the Cape Colony, or the migrations may first have been northwards and then again southwards down the east coast, with an admixture of other tribes, such as the Zends, spoken of by El Massoudi. At any rate I am absolutely convinced that the blood of the ancient builders of Zimbabwe still runs (in a very diluted form if you like) in the veins of the Bantu races, and more especially so amongst the remnants of the tribes still living in Mashonaland, and the Barotsi of the Upper Zambesi, who are, there is little doubt, a branch of the Barotsi tribe who were destroyed by the Matabele, though the separation took place long prior to this event.

I make this statement after much thought, a close study of the relics unearthed at Zimbabwe, and a knowledge of the natives of South-eastern Africa gained during many years of travel. There is no impassable gulf between a highly-civilised race and an utterly savage one, as some people would have us believe. Many things tend to prove that the ancient builders of Zimbabwe were a very rude people. They were sufficiently imaginative to have a religion, and possessed sufficient energy and concentration of purpose to carry to an end the immense work of building the temple of Zimbabwe. But the work itself, though very wonderful, is rude and unsymmetrical. Nowhere is the wall absolutely plumb, and on the top it varies considerably in breadth. The fact that no written characters have been found on any of the flat granite or soapstone beams imbedded in the walls, or the large flat stones standing upright like tombstones in the floor of the Zimbabwe, seems to me to prove that the people who built this temple were

unacquainted with writing of any kind. The only carvings on the sides of the soapstone beams are lozenge-shaped and herring-bone patterns (badly carved, not a single line being quite straight), agreeing exactly in some cases with the ornamentation on the outside of the temple; and more curious still, not alone with the patterns carved on the wooden knife sheaths, and scored on the pottery of the natives all over Mashonaland, but also with the patterns used in ornamenting the household utensils of all kinds in the Barotsi Valley hundreds of miles away.

In asserting that no sign of any written character has been found at Zimbabwe, I am aware that I am ignoring the small piece of soapstone brought home by Mr. Bent, with some marks scratched upon it. I do this advisedly, because I believe (and I am not alone in the belief) that these marks are quite modern. However, the stone, which is now in the South African Museum at Cape Town, may be examined under a magnifying glass. To me the scratches certainly seemed quite fresh, when I examined it at the late Kimberley Exhibition. The most curious relics that have been found at Zimbabwe are, undoubtedly, the birds carved sitting on the tops of the soapstone beams; these bear no resemblance to anything now seen amongst the Bantu people, and were doubtless connected with the ancient worship. Not so, however, the carvings on the soapstone bowls. These are very rude, so much so that the animals that have been taken by Mr. Bent to represent hippopotami, I take to be meant for baboons, as they have long tails. But the curious thing about these bas-reliefs is the close resemblance they bear to the wooden carvings of animals to be seen amongst the Bantu people at the present day. The genius of the ancient artists still lives amongst them.

Mr. Bent speaks of the "ruined cities" of Mashonaland. What trace of them is there, I would ask? I have seen the temple of Zimbabwe and some smaller ones, the fortress on the hill near the large temple, and further, many hundreds or thousands of stone walls in various parts of South-eastern Africa, but never a trace of a city built of stone. There is strong presumptive evidence that the structures which the people lived in near the great temple were huts plastered with mud. For this reason: at the foot of the hill on which stands the fortress are two immense holes dug in the ground. I have heard the theory advanced that these holes were used as reservoirs for water; but I take them to be merely the holes excavated by the people living on the hill, to obtain clay for their pottery and with which to daub their huts. The native population was large and endured for a long period of time; therefore the excavations are larger than those found at the side of any Bantu village at the present day; but, wherever there is a village, or the site of a deserted village, a similar hole, larger or smaller in proportion to the size of the town and the length of its duration, will always be found.

As to the relations of the ancient builders of the temple of Zimbabwe to the present inhabitants of the country. On my theory the blood of the ancient worshippers of Baal still runs in their veins; very much diluted, no doubt, but still in sufficient strength to occasionally produce amongst them men with light-brown skins and high features, and sometimes of great intellectual power. After a certain lapse of time, when the higher race had become entirely fused and practically lost amongst the lower and more numerous aboriginal people, the worship of Baal died out, and was superseded by the old religion of ancestor worship which still prevails; but I maintain that the wall-building and gold-mining, originally learnt from the ancient Arabians, were carried on continuously from the first inception up to the middle of the present century. It is the Zulu migrations northwards through Mashonaland which have taken place during the present century (invasions which have absolutely depopulated large areas of country) that finally obliged the Mashonas to cease working in the shafts which their ancestors had centuries before commenced to sink on the quartz reefs which abound in the country. As the mining had been carried on for a long period of time, naturally an enormous amount of work had been done in the aggregate, some of the shafts recently discovered in Mashonaland being as much as 120 feet in depth. But I cannot dwell on the subject here. Many people seem to imagine that an ancient race once existed in Mashonaland, who built temples and cities and did an immense amount of work in the way of gold-mining. This race, they say, was destroyed by the ancestors of the present inhabitants of the country, and the gold industry then ceased until the advent of the Portuguese, by whom it was again revived. It is this idea which I wish to combat. When the Portuguese arrived in South-Eastern Africa at the close of the fifteenth century, they found Arab settlements on the coast, and first learned from the Arabs of the gold mines in the interior of the country. These gold mines were being worked by the natives of the country, who used the gold as a medium of exchange, to buy the goods brought to them by the Arabs, and for centuries before this time their ancestors had in all probability made use of gold, whose value had been first taught them by the ancient builders of the temple of Zimbabwe to trade with the commercial peoples of the East who from time to time penetrated to Mashonaland. Thus, when the Arabs were driven from South-Eastern Africa the mining did not cease, as the natives simply sold their gold to the new-comers, whom they probably found even more anxious to obtain the metal than the Arab merchants had been.

After this period Portuguese records abundantly prove that the gold mining went on without interruption till early in the present century, and the old men amongst the Matabele, who took part in the first raids made amongst the Mashonas by Umziligazi's warriors, state positively

that they found the Amacholi working for gold in the "Amaguti,"—*i.e.*, "in the deep holes" between the Zweswe and Umfuli Rivers. An interesting confirmation of this statement lies in the fact that at the bottom of an old shaft, 120 feet deep, at Concession Hill, near the Zweswe River, Mr. Cock, in 1891, found a bucket and rope made of "Machabel" bark, besides some iron implements. Now this bucket and rope, evidently intended to haul quartz up with from the bottom of the shaft, being made of such perishable material as bark, could not possibly be of any great antiquity, whilst the iron implements, axes, etc., were absolutely the same as those in present use amongst the Mashonas, and showed no signs of age. Mr. Rolker, the American mining expert, lately in Mashonaland, also told me that from the condition of the heaps of *débris* at the mouths of some of the shafts, he was convinced they had not been long abandoned. And if my readers will turn to Mr. Baines' well-known book on the gold regions of South-eastern Africa they will find that the Mashonas were still little more than twenty years ago getting quartz from the reefs, which they roasted in great fires, and then pounded up with round stones in order to extract the gold. The passage I refer to reads as follows:—

"G. Wood took me to a place in which he had seen a heap of quartz burned, and another heap, piled with wood among it, ready for burning. The crushing stones, like a printer's slab and muller, had also been lying in a hut near, but at the time of my visit these were removed, and the calcined quartz also; but the other heap had been fired, and now lay mingled with the charcoal ready for crushing."

The Mr. George Wood here referred to was my constant companion for two years, and he often used to tell me how he had seen the Mashonas extracting gold from quartz; and he further told me that, after crushing the roasted quartz, they used to melt the gold into little ingots in small crucibles made for the purpose. There is nothing to be surprised at in this, as both the Mashonas and Makalakas still extract copper from the ore and run it into moulds, whilst in Katanga the form of the mould into which the natives run their copper is almost identical in shape with the soapstone mould found by Mr. Bent at Zimbabwe. Before quitting the subject of the ancient mining, there is one other fact which I will adduce as evidence that gold mining was carried on by the natives up to a comparatively recent date in South-eastern Africa, I was at Tati, in South-western Matabeleland, some years ago, when Mr. S. H. Edwards discovered an old shaft, and I examined it carefully in his company. At the mouth of the shaft was a heap of *débris*, on which a small tree was growing, about 4 inches in diameter, and, just beyond, a stack of roasted quartz, ready for crushing, and several peculiar round stones, of a kind that we had never seen in the district, intended to be used in grinding the quartz. The quartz vein itself had been about 5 feet broad on the surface of the ground, and

dipped at an angle of about forty-five degrees, going down in the shape of a wedge and becoming thinner and thinner, until at the lowest point where the work had stopped, it was not more than 18 inches thick, and the quartz at this depth could only have been extracted most laboriously by a man lying head downwards and picking at it. The *modus operandi* had probably been to first light fires against the face of the quartz to soften it before picking it out, as, where the work had been abandoned, the quartz was burnt black by fire. But the most remarkable thing about this shaft was the fact that, at its upper end, the roof was supported by about ten logs of Mopani* wood. At that time I had never seen a gold mine; but lately I have seen mines in Johannesburg with portions of the roof supported in precisely the same manner as in the old shaft at Tati. We knocked all these supports out, and Mr. Edwards and I examined them one and all very carefully. They had all been chopped with the same kind of narrow-edged axes used by the natives at the present day, whilst all of them were still covered with bark, and, in fact, were in such good condition that they could not have been very ancient. I imagine that this shaft was abandoned, together with others in the district, at the time when Umziligazi first took possession of Matabeleland, in about 1840. So much for the gold-mining in Mashonaland; now for the wall building.

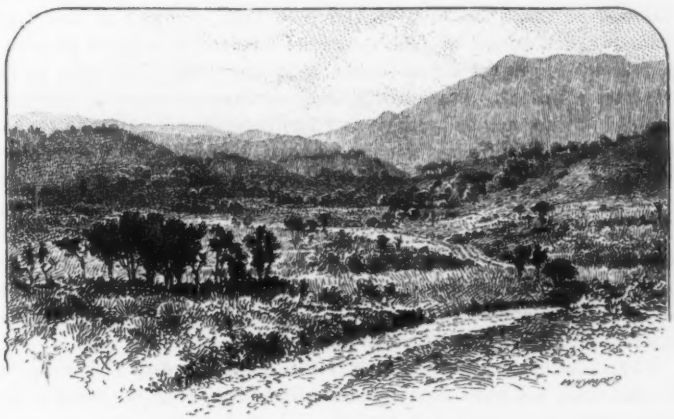
I maintain that, so far from there having been an abrupt transition from a people who built the temple of Zimbabwe to a race who never put one stone upon another, the inhabitants of Makoni's and Mangwendi's countries in South-eastern Mashonaland, only ceased to surround their towns with well-built stone walls during the last generation, when they found that these walls offered but an inefficient protection against the Zulu hordes of Manikos, and his son, Umzila, by whom their country has been continually ravaged during the present century. The more ancient the towns appear to be, however, the better, speaking generally, they have been built; and in Makoni's country, at any rate, there is clear evidence that there has been a gradual deterioration from a people who were capable of building walls which will compare with any part of the great Zimbabwe, to the very inferior hut-building barbarians of the present day. Makoni's† town as it now stands is a monument of filth and uncleanliness, and is undefended by anything but a small fence. His old town which I also visited, and from which I believe he was driven by Umtasa, was surrounded by a moat and a loopholed mud wall, whilst the town, which it is said was built by his ancestor, Chipadzi, was surrounded by a well-built, loopholed stone wall. This is one of the best old walled towns I have seen. I visited it for the first time in October, 1890, and again last year. There are

* This is the common wood of the district.

† Father of the present chief.

many other walled towns in the district, some of them reminding one strongly of the fortress on the hill at Zimbabwe.

Let me here make an extract from my diary, bearing date October 19th, 1890. "On that day I left Makoni's and passed some very curious old ruins. First, there was a hill on which were built several concentric walls and the stone foundations of round huts, the whole being surrounded by a moat. A little further on, there was a small kopje composed of a few large blocks of granite, some of which were piled up in the centre in the form of a tower. The whole of this kopje was enclosed by a very well-built wall about 200 yards in circumference, 8 feet in thickness, and 10 feet in height. The stones composing this wall have the appearance of having been cemented together with mud, which is the first time I have ever noticed anything of the kind



THE SELOUS ROAD, MASHONALAND.

in South-eastern Africa. Through this wall there were four entrances, apertures about 4 feet in height, and 2½ feet in breadth. These apertures were let into the base of the wall, and were roofed over with large flat slabs of granite. Inside this wall were the foundations of numerous round buildings. These foundations were all very well built of closely fitted pieces of squared granite, and were about 18 inches in depth. The huts that were built upon them must have been at least four times the size of the huts used by the natives at the present day. Whilst speaking of these carefully fitted stone foundations on which to build huts, I may mention that in the centre of Umtasa's deserted town on the Chodzani River, a town which he built himself, and from which he was driven a few years ago by the Abagaza, will be found a similar hut foundation, very carefully built of small slabs of granite, beautifully fitted without mortar or cement, which proves that the art of building

walls of carefully fitted granite stones is not even yet dead amongst the Mashonas."

However, let me return to the walled town of Makoni's ancestor. Besides the four entrances into the stronghold, there were numerous small holes let into the wall, some of which may have served as loopholes through which archers discharged arrows, but others, from their position I judge to have been intended for drains to carry off water. This stronghold is said to have been built by Chipadzi, the ancient chief of all this part of the country and an ancestor of Makoni's. The name of the walled town is Chitiketi.

About half a mile from this old walled town was the burial-place of Chipadzi, one side of which was enclosed by a beautifully built wall about 10 feet high, of evenly laid and squared granite stones, most carefully fitted together without mortar or cement of any kind. This wall was an exact facsimile of the best built portions of the great Zimbabwe, and no one who has examined carefully both these relics of a bygone age, can doubt for an instant that they were both built by the same race of people. This place is the Zimbabwe or temple of Makoni's people, and is spoken of by them as "The Zimbabwe." Here in time of national trouble the chief slaughters cattle, and makes propitiatory offerings to the spirit of Chipadzi, and private individuals make offerings of goats, fowls, or pots of beer. Now there is no tower or indeed anything to make one believe that this Zimbabwe was ever connected with Phallic worship. It was probably built long after the great temple, when the Arabian element had become lost amongst the more numerous aboriginal race, and when the people had replaced the worship of Baal by the still older form of ancestor-worship.

The enclosure is probably simply the burial-place of Chipadzi, but the wall could not have been better built had it been the work of the actual builders of the great temple. I may here say that the word Zimbabge or Zimbabghi (the form used by the natives in the neighbourhood of the ruins) is in all probability derived from the words "umba" or "imba," a building, plural zimba, and "mubge," "stones," these words being used at the present day in Mashonaland. Thus Zimbábge means the "buildings of stones," and as there were no other buildings except grass thatched huts, came to have a special significance and may be best translated by the English word "Temple."

In the foregoing pages, I have endeavoured to show that there is no evidence that any high form of ancient civilisation ever existed in South-Eastern Africa at all, whilst many facts go to prove that the two industries or arts which are supposed by many to separate the ancient inhabitants of the country from the Bantu people living there at the present day, namely, gold-mining and wall-building, have only been abandoned very recently. The evidences of Phallic worship which have been discovered at the temple of Zimbabwe, give one a fair right

to suppose that the original builders of the temple came from a country where that form of worship is known to have been practised in very ancient times; but I do not believe that this foreign race, in its pure state, spread over the whole country between the Zambesi and the Limpopo, and did all the gold-mining and wall-building that has been done in that vast territory, and was then utterly destroyed and supplanted by a more barbarous people. The evidence available seems to me to be far stronger in favour of the theory which I have advanced of the gradual fusion of a numerically small number of a race of traders and merchants, who were themselves in a low state of civilisation, with the aboriginal inhabitants of the country. Thus alone can I account for many things; the long continuance and the gradual deterioration noticeable in the wall-building in Mashonaland; the ingrained inherited impulse which causes the Barotsi of the Upper Zambesi, who are an offshoot of the Barotsi of Mashonaland, to still carve the same chevron patterns on their pottery, on their knife-sheaths, and on their wooden pots and bowls, that the ancient worshippers of Baal represented in stone-work round the Temple of Zimbabwe and carved in soapstone hundreds or thousands of years ago. Add to this that the wooden bowls themselves still retain the same form as the ancient ones carved in soapstone; that the wooden carvings of animals made at the present day, and the rude bas-reliefs on the soapstone bowls are the products of the same school of art, and the fact that the Bantu races inhabiting Mashonaland and adjoining countries to-day are subject to atavism or reversion to a type of man, which is Asiatic or semitic rather than negroid, and it seems to me that only one theory is possible, which is that the ancient builders of Zimbabwe were not first destroyed and then supplanted by an inferior race, but that they became gradually fused with a lower race, which still bears traces of its admixture with the more intelligent people.

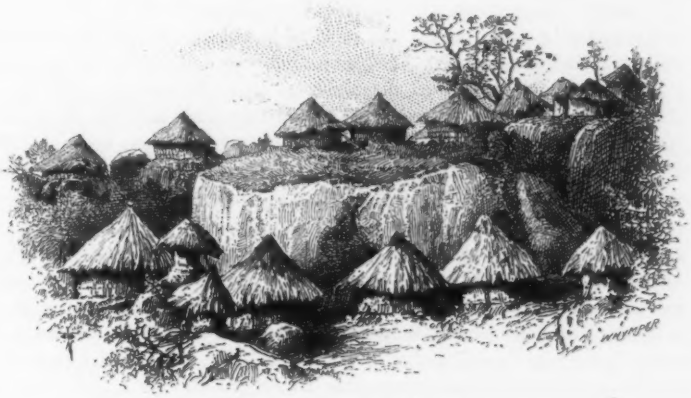
I will now say a few words concerning the history of Mashonaland in modern times, which I think will show, that it is not to be wondered at that the native races inhabiting that country should have abandoned some of their arts and industries, and become the timid and broken-spirited people which they now are.

As far as we can learn, the country we now call Mashonaland was in the early part of the present century ruled over by the ancestors of the petty chiefs Makoni, Mangwendi, Motoko Sosi, Umtasa, &c., who were the rulers of large and prosperous tribes, living in huts, the foundations of which, where they still exist, show them to have been at least three times the size of the miserable tenements which satisfy their degenerate descendants, and whose towns were, for the most part, surrounded by well-built and loopholed stone walls, many of which still remain in perfect preservation to-day, especially in the country of Makoni, the chief of the Ma-ongwe. Hundreds of thousands of acres

that now lie fallow must then have been under cultivation, as is proved by the traces of rice and maize fields, which can still be discerned in almost every valley, whilst the sites of ancient villages, long ago crumbled to decay, and now only marked by a few deep pits, from which the natives obtained the clay used by them in plastering their huts, are very numerous all over the open downs, where no stones were procurable with which to build walls round the towns. On almost every hill traces of the stone walls will be found which once encircled and protected ancient villages. At that time the inhabitants of this part of Africa must have been rich and prosperous, possessing large flocks of sheep and goats, and numerous herds of a small but beautiful breed of cattle. This state of things was not, however, destined to continue, for some twelve or fifteen years after the Cape of Good Hope became a British Colony, in 1806, some of the outlying Zulu clans broke away from the harsh and cruel rule of Chhaka and commenced their migrations northwards; and wherever these ferocious warriors went their track was marked by the flight of the vultures which feasted upon the corpses of the men, women, and children they had slain, and the flames of the villages they had set fire to. Manikos, the grandfather of Gungunyan, the present chief of the Aba-gaza, was the leader of one of these bands, whilst the ancestor of Pezen, the principal chief of the Angoni, who are now settled to the west of Lake Nyasa, led another horde. These two Zulu chiefs, after devastating a great portion of what is now called Mashonaland, both settled near the head-waters of the Sabi, where they soon came into collision with one another. A great battle was fought, lasting, so Bengula told me he had heard from old men of the Abagaza, for three days, at the end of which time the Angoni were defeated and driven from their settlements. They retreated northwards, devastating the whole country through which they passed, and crossing the Zambesi to the east of Zumbo, made their way on to the high plateau, which lies to the west of Lake Nyasa, where they are living at the present day, a scourge to all the surrounding tribes.

After the battle with the Angoni, the Abagaza retreated southwards and settled on an elevated and fertile tract of country to the east of the Central Sabi, and from that date, until a few years ago, they never ceased to devastate the southern and eastern portions of Mashonaland, their principal raiding grounds being in the countries of Mokoto, Mangwendi, Makoni, Sosi, and Makwirimba. In spite, however, of the devastations committed by the Angoni and the Abagaza, large portions of northern and western Mashonaland remained untroubled by the Zulu raids until about 1840. About this time the Amandebele, under their warlike chief, Umziligazi, being unable to hold their own against the Dutch Boers, who were then commencing to settle in the Transvaal, crossed the Limpopo, and travelling northwards, destroying as they went,

finally halted, and built permanent kraals in the country now known as Matabeleland, and soon well-disciplined bands of desperate savages men born and bred amidst the ceaseless slaughter of Chhaka's never-ending wars, overran every portion of Mashonaland, which had up till then escaped the blood-stained assegais of the Angoni and the Abagaza. These oft-recurring raids upon the unwarlike inhabitants of Mashonaland, raids carried out with all the ruthless ferocity of savage warfare, almost completely depopulated large tracts of country, and, as may be easily understood, at once put an end to the gold-mining industry, which, there is no doubt, was still being carried on in the early part of this century, and also put a stop to the wall-building, as the Mashonas found out that the walls with which they had been accustomed to encircle their towns, and which were probably very often an effective



NATIVE VILLAGE, MASHONALAND.

means of defence against other tribes of their own race, were of but little avail against the braver and better-organised Zulus. Thus the high plateau of Mashonaland, which at no very distant date must have supported a large native population, once more became an almost uninhabited wilderness, as the remnants of the aboriginal tribes who escaped destruction at the hands of the Zulu invaders, retreated into the broken country which encircles the plateau to the south and east. Had it not been for the constant destruction of the native races that has been going on in Mashonaland during the last seventy or eighty years, there would be no room for European immigration to-day. As it is, not only has the occupation of the country by the British South Africa Company been effected without wronging the native races, but it has very likely saved some of them from absolute destruction at the hands of the Matabele.

I have brought the history of Mashonaland up to the time of the recent occupation of the country by Europeans, and I must, before leaving Mashonaland, say a few words about the country itself. Almost the whole of Mashonaland and Manica lies at an elevation of over 3000 feet above the sea, whilst much of the plateau (especially that portion of it lying to the south-east of the main road from Salisbury to Umbali) reaches an altitude of from 5000 to 6000 feet. The higher portions of the country, though lying well within the tropics, possess a thoroughly temperate climate which is primarily due no doubt to their altitude above sea-level, but also in a minor degree, I think, to the fact that it is the highest land in South-Eastern Africa, and therefore catches directly the cool winds coming from the Indian Ocean. At any rate, during the hottest months of the year the heat of the sun is almost always tempered by the breeze which constantly blows from the south-east—a breeze which, during the winter months, is apt to become so keen and cold, that an Englishman suddenly transplanted from home, and deposited, without knowing where he was, on some portion of the Mashona uplands, would never dream that he was in tropical Africa, but would be rather inclined to believe that he stood on some wild moorland in northern Europe; and the sight of a bed of bracken, looking identical with what one sees at home, would only lend colour to this belief. The nights are cool the whole year round, and during the winter months bitterly cold, whilst the excessive heat of the sun, during the spring and autumn, is always tempered, as I have said above, by the south-east breeze. An ounce of fact is worth any amount of theory and assertion, and a table of temperatures kept daily for two years by Major Forbes, at Salisbury, in Mashonaland, and which is now in the possession of Mr. E. G. Ravenstein, will, I feel sure, satisfy any one who cares to examine it that the climate of this part of Africa is an exceptionally fine one for North Europeans.

If not exposed to privation and hardship, it has already been conclusively proved that European women and children enjoy excellent health all over the plateau of South-Eastern Africa—whether in Matabeleland, Mashonaland, or Manica. In fact these are emphatically countries that will rear a strong and hardy race of men—such men as are the descendants of the English and Scottish colonists of the Cape Colony or the burly Boers of the Transvaal. During eight months of the year the whole country is very healthy, but during the remaining four, from the middle to the end of the rainy season, fever is very prevalent in the lower parts of the country, and will almost certainly be contracted by anyone who is unduly exposed to cold and wet in any part of the country.

The same may probably be said concerning many other portions of the world, in which large communities of Europeans are now living; and it has already been abundantly proved, both in Mashonaland,

Manica, and Matabeleland, at Salisbury, Umtali, and Bulawayo, that, given the most ordinary conditions of comfort, and freedom from excessive exposure, white men, women, and children, enjoy as good health in these countries as in any other part of South Africa. I need now say no more concerning the present condition of Mashonaland, than that it bids fair to become at no distant date one of the richest and most prosperous of British colonies. The future of its vast goldfields is becoming every day more assured, and the railway now in course of construction from the Pungwe River to the borders of Manica will facilitate their speedy development, by affording the means of introducing the heavy machinery necessary for mining operations. Three townships have been laid out, not only on paper, as unfriendly critics would have one believe, but in fact, as many substantial brick buildings have been put up both in Salisbury and Victoria, in both of which townships a good weekly newspaper is now printed. Much of the land too has been taken up by farmers, who have already proved that wheat, oats, barley, and every kind of vegetable, such as potatoes, onions, cauliflowers, cabbages, carrots, etc., can be grown with greater facility than in any other portion of South Africa, as the country is so magnificently watered that irrigation works can be carried out during the dry winter months with comparatively little trouble or expense.

Before concluding my account of exploration in Mashonaland, I must not forget to mention that in 1884 my friend, the late Mr. Walter Montagu Kerr, made a very remarkable journey through Mashonaland to Chibinga, and from thence to Tete, and from there through the Makanga and Angoni countries to the southern shore of Lake Nyasa. Dr. Knight Bruce, Sir John Willoughby, and Mr. Swan, who accompanied Mr. Bent as cartographer, have also done a lot of good and careful work in Mashonaland, so that the materials probably now exist for the compilation of a very accurate map of the whole country. In 1884 I met Mr. W. Montagu Kerr in the Transvaal, and he travelled with me to Matabeleland. We there parted company, and whilst he journeyed eastwards through Mashonaland to the Zambesi, I started for the Mababi River, and piloted my waggon for 300 miles across country, chopping my own road as I went, until at last I struck the old hunting track from Khama's town to the Mababi, near the pool of Sode Garra.

I have now given some account of all my journeyings, with the exception of those undertaken in the year 1888 to the Mashuku-lumbwe and Barotsi countries, a narrative of which I sent to the late Mr. Bates in the form of a letter, which was published by him with an accompanying map in the *Proceedings* of the Royal Geographical Society for April 1889. I need not repeat here the narrative which has already been printed in the Society's publication.

In October 1888 I once more reached my waggon at Penda-ma-tenka,

and, after doing a little more mapping work south of the Zambesi, returned to the Colony, and thence to England, which I reached in the end of February 1889. Early in May I was again in South Africa, and soon afterwards made my way to Mashonaland through the Portuguese possessions on the Zambesi. In the following year, 1890, I guided the British South Africa Company's expedition to Mashonaland, and it is a matter of history that over 400 miles of road were made through a wild country of forests, swamps and mountains without ever a mistake or the detention of the large column of eighty waggons for one single hour owing to the road not being ready for them. This memorable march was accomplished in less than two months and a half, from Fort Tuli to Fort Salisbury. After the occupation of Mashonaland I remained in the country for two years, in the service of the British South Africa Company, and the nature of my work enabled me to make a very careful compass survey of a large portion of the Mashona plateau. Of this work I have already spoken in this paper, and so need say no more here.

In conclusion I wish to point out that with the exception of the attack made upon my camp by the Mashuku-lumbwe, led by a few rebel Marotse, in 1888, I have never had any other serious trouble with the natives. During my twenty years' wanderings I have been amongst many tribes who had never previously seen a white man, and I was always absolutely in their power, as I seldom had more than from five to ten natives with me, none of whom were ever armed. On the whole, therefore, I think I may say that the natives of the interior of Africa with whom I have come in contact have treated me well; and, on the other hand, I can proudly affirm that in my person the name of Englishman has suffered no harm in native estimation.

After the reading of the paper the following discussion ensued:—

Mr. E. A. Maund: If I may trespass upon your time for a few moments, I should like to say a few words with regard to Mr. Selous. In my hunting excursions up in Matabele and Mashonalands I had the advantage of having hunters, trackers, and boys who had travelled with him; one of them, Van Rooyen, a Dutchman, being one of the greatest hunters in those parts after our Nimrod. The stories of Selous' doings I have often listened to far into the night as described round my camp fire by his excited and admiring followers. Mr. Selous is not only known as a hunter, held in awe by the Matabele for his unerring aim, and beloved by the Mashonas as a food-giver, but he is a map-maker, and *the* road-maker of Mashonaland, and the absolute pioneer of that part of Africa; for it was he who guided the expedition that opened up that part of the country for our colonisation, which to-day is being developed with such rapid strides. There being so many present who now know that country, I should like, if possible, to make a geographical point to-night, because we do not often get the opportunity of having present at our meetings men who have been five-and-twenty years in such a country, like Mr. Phillips—who I believe is present—and Mr. Selous, who has spent twenty years there, and whose authority should therefore carry great weight. Mr. Bent has said, and I believe has made a point of it in his interesting book, that this

country ought to be called *Makalangaland*. Unfortunately he is not himself present to-night, being at the moment in Africa. Now the people referred to are not *Makalanga*, but *Makalaka*. In the Matabele highlands these people exist in considerable numbers, and regiments are incorporated from among them. Down where Mr. Bent was, at Zimbabwe and on the Sabi (and he was only there for a few months), he says they were called the Makalanga; but the boy who called them so was a Matabele, and among the Amandabele they are called Makalanga as a term of opprobrium; traders, missionaries, hunters, and even themselves in Matabeleland, know them as Makalaka, and there is too a Makalaka quarter in Khama's town. They form but a portion of the native population of Mashonaland, and yet we are told by Mr. Bent that our new colony should not be called Mashonaland but Makalangaland. Mr. Phillips will, I believe, corroborate my views with regard to this difference and its meaning. The *n* sound is often introduced in the Zulu pronunciation of such words, and anyone not long resident in the country might easily fall into error. But in errors of this kind, from whatever cause they may arise, there is what I may call a geographical danger. When Matabeleland is occupied we may be asked to change its name in order to agree with some local Mashona pronunciation; but we may believe, and rest indeed in the assurance that there is a fair prospect notwithstanding, that "*Mashonaland*," the title of our new colony, will survive even the ruins of Zimbabwe.

Mr. George Cawston: I am proud to have this opportunity of testifying in public, on behalf of the British South Africa Company, of which I have the honour to be a Director, to the great services rendered to that Company by Mr. Selous. Mr. Selous has interested us for an hour, as he might have done for many an hour, recounting his experiences and adventures in the country lying to the north of Tuli; but he said but little of the work which will be handed down with his name to posterity. As you all know, I speak of the Selous Road; but as there are probably many here who do not know what was the object of that road, I hope I may be allowed to trespass for a few minutes upon your time in order to explain its objects and its results. When the Charter was granted by Her Majesty, in the end of 1889, to the British South Africa Company, the first object the Directors had in view was to place a settled European population in the centre of the districts entrusted to their care. This was no easy task, and I do not think we here recognise the difficulties of that task and the distances that had to be traversed. I may compare them best with a supposed expedition organised at Gibraltar, to plant a colony somewhere in the neighbourhood of Strasburg. As far as the Pyrenees the road, although difficult, was known and safe; but from the Pyrenees a new road had to be made, through a district known only to one man, and that man Selous, having a strong and very hostile population lying along the flank, somewhere in the neighbourhood of Paris. That road was commenced in the spring of 1890, and in six months it had accomplished its work. You will see from the photographs which Mr. Maund has shown you this evening what Salisbury was, and you can read from its own press what it now is: the centre of a large European population, where thousands can live on the high healthy plateau. But there is one greater result, of which we all feel proud—the having made that road, and effected the occupation of Mashonaland, probably the first time in the history of the world that a civilised people have occupied a savage country without the destruction of the native aboriginal inhabitants. The old order of things has been reversed; for generally the traders went, first quarelled among themselves, and then quarrelled with the natives, with the result that the natives were destroyed. In this case we, in the first place, not only planted an European population, but a population strong enough to maintain order. The result has been that for the first time

for forty years the Mashonas have not been raided by the Matabele, and the whole of the country has been occupied without the loss of a single life in anger. Mr. Selous has related some of his experiences in the Barotze Valley. I can only say that when the time comes for us to occupy that country these things will be impossible, and the cruelties practised there will be stayed by a strong hand. I believe the fact of our having occupied this country without bloodshed during the first advance is of itself the strongest argument in favour of the policy of colonisation by means of Chartered Companies.

The PRESIDENT: You will not wish me to adjourn the meeting before I have said something about the address which Mr. Selous has delivered. He has mentioned to me that this is the first time on which he has ever addressed an audience. I think that if we had not heard that, we should have supposed that he had done nothing else all his life. Mr. Maund added to the interest of the evening by explaining very clearly his admirable photographs, and Mr. Cawston has brought home to us the work which Mr. Selous has done by a very apt and useful comparison with places which we know in Europe. I am sure you will wish me to return to all of them your most sincere thanks.

MAP OF A PART OF SOUTH AFRICA SHOWING THE ROUTES OF MR. SELOUS.—The map which accompanies this paper is merely intended to show the more important routes traversed by Mr. Selous in the course of twenty years' wanderings. An attempt has been made at the same time to tint the country represented according to elevation above the sea. Unfortunately the altitudes available for that purpose are not as trustworthy as could be desired, and those made by different observers in the same locality exhibit sometimes the most extraordinary discordant results. Lake Ngami presents an instance of the kind. Its elevation above the sea-level is given as follows by succeeding observers:—Anderson 3710 feet, Dr. Livingstone 2900 feet, Chapman 2260 feet, Dr. Holden 2660 feet, and Captain von François 3080 feet. The last of these has been accepted, its calculation being based upon synchronous observations made at Walfish Bay. A map on a large scale embodying the whole of the results of Mr. Selous' explorations and surveys is being prepared for separate publication.

NOTES ON A PORTION OF THE KALAHARI.*

By EDWARD WILKINSON.

IT is with great diffidence that I venture to lay before you a few details of recent visits to that small portion of the Kalahari which lies in the north-western corner of British Bechuanaland, and in the adjoining tracts of the Bechuanaland Protectorate. There is nothing of adventure to describe. The notes may, however, be of some use, as they refer to a locality little known, and moreover my trips have led me to

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* Read at the evening meeting of the Royal Geographical Society, Monday December 5th, 1892. Map, p. 384.

think that existing maps are in error in their delineation of the course of the Molopo River. What led me there in the first instance is easily explained. I wished for once to exchange an English winter for a foreign summer; and, having decided on South Africa for that purpose, I was further drawn to this special locality by the fact that I had not much time at my disposal, and there was no part which was so little known, which was also so readily accessible. My original idea was to go west from Mafeking, as far as the longitude of Luhututu, thence to Luhututu, and so diagonally back to Mafeking, through Kanye or not, as convenience or necessity indicated. We—that is, my friend L., who accompanied me from England, and myself—fitted out in the usual manner at Kimberley, namely, with a full-tilt waggon drawn by twelve oxen (which soon had to be increased to sixteen), four horses, and the usual complement of black, or half-breed, troublesome servants, or "boys." Arrived at Vryburg, we met a man very well known in Bechuanaland, and who, if half that is told of him is true, must be the Claude Duval or Starlight of South Africa, and whom I henceforth designate as S.; and he, hearing of our proposed route, expressed a wish to accompany us. This was, mainly, from an idea that we should pass near Chwani, a place south-east of Luhututu, where some maps indicate (but, as I imagine, without sufficient authority) the presence of gold. It was mainly owing to his great knowledge of the country, and topographical instinct where knowledge failed, and to his careful management whereby the oxen survived, and even without much loss of condition, heavy work in a period of extreme heat and drought, that we escaped disaster. We were at Vryburg in 1888, on Christmas Day, or just at midsummer; and the summer is usually in Bechuanaland the rainy season. This summer, however, the rains failed in the greater part of the country, or did not fall till months later than usual, and this made travelling in all the early months of 1889 very difficult, and somewhat risky. I may say here, that L. and I went over very much the same ground again in 1890–1, having returned to South Africa, partly to make sure of the genuineness of a concession by a native chief of a large area of ground in the region lately visited by us (which concession did not reach England till 1890), and partly, if satisfied on that point, to examine the ground more carefully. Any general views are the outcome, therefore, of the two visits.

The idea of Chwani having superseded that of a more or less vague half-hunting, half-exploring round, a change was made in our proposed itinerary, and accordingly, on leaving Vryburg we went, not towards Mafeking, but in a north-westerly direction through Genesa and Morokweng. These are very large native stadts, or towns, the first about 42, and the second about 95 miles from Vryburg. Morokweng, which probably has not less than 3000 inhabitants, is the last large native town before entering the Kalahari. In 1888 an outpost of four

men of the British Bechuanaland police, under a corporal, was maintained there, an insufficient force, as the natives there are much inclined to be troublesome; but on coming back, a few weeks later, we found that it had been withdrawn, it having been necessary to strengthen the force upon the Transvaal and Bamangwato frontiers, and the post has never been re-occupied. Three men are still kept at Genesa, and these are the only representatives of English authority for hundreds of miles, in a region not lying away in the Protectorate, but forming an integral part of the Crown colony of British Bechuanaland. This colony is larger than England and Wales together, and its actual available police force probably does not exceed 100 men, or less than are employed in London between the General Post Office and the Marble Arch. And though exception was taken, in the House of Commons, to a vote for a slight increase in the force on the ground that it was inordinately large already, I am bound to say that I think it quite inadequate, having regard to the increasing insolence of the natives. I only refer to this point as it is one of which intending settlers ought not altogether to lose sight, though I readily admit that the Bechuanas, as a people, have generally been peaceable, and fairly inoffensive.

At Morokweng granite is visible in the bed and round the borders of its fine vley; but it soon disappears, overlaid apparently by a shallow siliceous-calcareous formation. The pans are almost always of limestone, and where pits exist in this part, they are dug out of the limestone. From Morokweng we proceeded northwards, and at Sekeleke, or Skellet, struck the bush country, or desert proper. From here onwards we were always among trees—mainly haakdoorn (equivalent to hookthorn), camelthorn, and mimosa—and we frequently had to cut out a passage for the waggon. I find a note in my diary as follows, in reference to this part of the journey: "The sand is heavy, and the wheels sink in it far over the felloes; but it is rich ground notwithstanding. The luxuriant grass (which grows in bunches or tussocks much as the buffalo-grass of the prairies), and the numerous and various trees, growing in all the wild tangle of nature, make the desert, so far, the most attractive, and, indeed, if I except Barkly West, the only attractive part I have yet seen in Africa." The first view of the Molopo River valley was enchanting. We reached it about seven in the morning, while the dew was still glistening on every bush and blade of grass. Far as the eye could reach trees lined the gently-sloping sides of the wide valley; and the cluck of river pheasants and the noisier clamour of guinea fowls gave cheery signs of life. We fortunately found some rain-pools in the river-bed, and camped there three or four days. There had evidently been natives about the pools; and we were anxious to get their advice and aid in making our way to Kokong; but all seemed to have fled. However, on the second day, a woman was surprised a few miles from the camp, and

her fears being allayed on finding that we were English, she promised to bring in her people. From that time there was always a crowd of them squatted round our camp, quietly grunting their astonishment at our queer ways. The sextant seemed to puzzle them as much as anything. They were all Vaalpense, or serfs. They had fled in the idea that we were Boers come on a kidnapping expedition, that notion having been spread, as I believe, by their masters, who wished to throw every obstacle in the way of our progress. Even when they knew that we were English they wanted to know who our Boer masters were, and for what purpose they had sent us to travel; for the native mind is as yet far from disabused of the idea that, since the Transvaal fiasco, the English have been slaves to the Boers.

I am not competent, and anyhow it would take too long, to describe the various grades among the Vaalpense, and the various ramifications of the Vaalpens system. Speaking generally, the Kalahari is occupied by them. Here they are the vassal hunters of the various tribes—Batlaro, Barolong, Bangwaketse, and others—who live round the desert, being found in guns and ammunition by their masters, to whom they have to account for the skins of all animals killed by them. Hunting, and digging up the roots on which they mainly subsist, are almost the only forms of ndustry, as the carosses, made from the skins, are more often made up by the masters, who do not seem to me to give themselves, as a rule, much more occupation in life than smoking and lazily rubbing the skins to make them pliable, and fit for sewing together into carosses. The stadts of these master-tribes are full also of domestic Vaalpense, who do the bulk of the work connected with the cornfields; and at any time a master wanting hands can fetch some from the desert. Though more than one flagrant case came under my notice, I should be sorry to say that, as a rule, any great cruelty is practised on them; cruelty is not a characteristic of the Bechuanas. But their lives are undoubtedly hard, if only in this—that those living in the desert are liable to be robbed of everything they may have got together in their desert homes, and also to be called away; and those living in the stadts are in any time of scarcity turned adrift into the desert to shift for themselves. Extreme jealousy is shown of a Vaalpens acting in a way which looks like his being lost. One with the assent of his immediate master accompanied us from Morokweng; but his joy in being with us was marred by the constant threats uttered towards him by members of any master-tribe who saw him; and after two or three months he fled, and returned to his bondage.

The people round our camp insisted that it was quite impossible for us to get the waggon through to Kokong, on account of the density of the timber and the want of water; but they offered to guide us there if we could go with pack-oxen, the time necessary to reach it being, they said, five days. As there was only one pack-ox in our team, we could not

manage this, and we decided, therefore, to follow the river-bed downwards, as it would lead us west. We had the more confidence in doing this, as Mr. Anderson's and other books had led us to believe that water could always be found in the river-bed by digging. Though we only tried hard once to dig for water, I think this, as a general statement, is incorrect. Our effort was made at about 15 miles from our first river camp, and the spot looked promising. It was at a slight bend at the junction of a small laagtë with the river-bed, and the late presence of a fair-sized pool was indicated by a coating of dried mud, and by the presence of a plant which I could not distinguish from our common water persicaria. After about 2 feet of hard blue-black soil came about the same depth of hard sand, requiring to be broken by a pick. This gradually became softer, and at about 6 feet was mingled with small shingle, and was white, slightly damp, and cold, but no water oozed through. A very thin band of a sort of pot-clay followed; but soon the dry sand recurred, and was succeeded by a very hard calcareous sandrock. I knew it was hopeless; but we worked on slowly and painfully till we had got down some 12 to 14 feet, by which time our picks and crowbars were almost useless; and we then gave up in despair. The oxen and horses had been meanwhile sent back for water to our old camp. It is perfectly certain, therefore, that the Molopo is not a sand river, like the Setlagoli River for example, in which the removal of a foot or two of loose white sand reveals the presence of cool fresh water. If the white shingly stratum I mentioned is continuous, it is probable that in an ordinarily wet season, and for some weeks after the cessation of the rains, water would be obtained at its level, but it would probably not be a copious or permanent supply. That is probably to be found lower down, and somewhere near, perhaps, rather than in, the present river-bed.

From what, in memory of our digging, we called Well Camp (not that it was at all well with us there), our progress was very slow. We never dared to take the waggon on till we had explored ahead and found water, this generally meaning at least two days' delay at each camp. We drank up the water as we went, but were fortunate in finding always just enough ahead to go on with. This shows that a little rain did fall, though it very seldom touched us. A fall of the barometer and gathering of heavy clouds occurred almost every afternoon. Each day we hoped to come to the fork in the river given in every map. Unfortunately, in our first visit my half-chronometer, a most reliable instrument generally, went all wrong, gaining far beyond its normal gaining rate, and as we were travelling west, making me think ourselves far more to the west than we really were. I had not taken enough care of it. It was exposed to terrific heat, the thermometer in the sun being frequently over 122°, and to the inconceivable jolting of waggon travelling when I shifted from horseback to the waggon. On our second

journey (which, moreover, was in a much cooler season), I almost lived for it, getting off the waggon over rough ground, and never dispensing with a waistcoat during the heat of the day, so that the watch worn inside it might have the more uniform temperature of my body. On this occasion, therefore, it went well, and this time we had a trocheometer also. Though, however, I do not think that any of my longitudes are likely now to be more than 5 miles in error, you will all know that observations depending on a single instrument, the rate of which constant movement made it impossible to ascertain, are not very reliable. It is curious that though I had taken a telescope the second time, in order to be able to pick up the Greenwich time pretty nearly by observing occultations or eclipses of Jupiter's satellites, I had not a single chance afforded me, clouds in this unusually wet season always obscuring the heavenly bodies at the critical moments. To reach this fork of the river was of great importance to us. If the maps were right, Kuis, with its water-pits, lay within 50 or 60 miles of it, a possible distance to travel without water, if sure of it at the end,—and Maubelle was supposed to come before Kuis. I cannot satisfy myself that any such fork exists. A short distance before Mokopon the river-bed turns nearly south, and though a laagtë comes in from the west near the corner which would, in position, in some respects answer the northerly branch of the river, my friends, who explored it, said that it was uphill, not a descent of a river course, and that it soon led them out on the high flat veldt. The natives at Mokopon always expressed ignorance of any other river-bed. I can only suggest two explanations. One is, that as "Molopo," or "Molapo," means water in Sechuana—so that even a wretched little hole in the ground near Maralilen, where water collected at about the rate of half a bucket an hour, was called the "Molopo"—travellers, on finding some river-bed coming from the north or north-east into that of the Molopo below Kuis, and hearing both called Molopo, may have considered it to be the reunion of two branches of the same river. The other is, that the latitudes given in the maps are wrong, and that the fork occurs more to the south than the crossing between Honing Vley and Maubelle.

We continued to follow the river-bed for a few miles; but beyond a place which we called Circus Camp, a short way below Mokopon, we could not find or hear of any more water in it. S. ascertained that there was some at Maralilen, and it was decided that I should go there with the waggon, and thence next day push on to Maubelle, believed to be about 15 miles further, while L. and S. rode on down the river, taking a pack-horse with a bag of water. The bag had been very skilfully made by them out of L.'s waterproof ground-sheet, with an outer covering of navy-boiled canvas, the bag being made with two ends, like the long purses of our young days, so as to balance one another on the animal. We often found it useful afterwards. Starting

on February 3rd at sundown, I was quickly brought to a standstill by a light drizzle, which compelled me to outspan, as wet with the friction and pressure of the yokes quickly makes the necks of the oxen sore. It lasted more or less all night, and day was breaking before I could push on. It was dreadful travelling, the sand very heavy, with a black dust rising from the grass, which had been burnt for miles. At last, at 1 A.M. on the 5th, we reached what Sehetlani—a guide picked up at Circus Camp—told me was Maralilen, but which I found in 1891 to be Kesa, 3 miles short of it. I was most anxious to water the animals at once; but he told me it was impossible, though he did not explain the reason. At earliest dawn I roused the camp, and we proceeded to lead or drive the animals to Maralilen. The water there was in a small fissure in the quartzite rocks about 12 feet down, and I was delighted when Sehetlani sent up two buckets full of water without any delay. Then, however, we had to haul up sand for an hour or so, and by this time the gathering of several natives—mostly women, armed with reeds—brought home the appalling idea that this was after all only a sucking pit. The suckers scoop out a hole as far as they can reach with their arm, and into this thrust two reeds, one with grass bound round the lower end to serve as a strainer, the other to keep up communication with, and thus the pressure by, the outer air; and then, filling in the hole again, they commence sucking, ejecting the water from their mouths into tortoise-shells or other receptacles. There was room for but three in the hole at one time. The rate at which they can work is extraordinary; and how these poor creatures worked, relay after relay, indefatigable beyond all others being Sehetlani and his two wives! But fancy watering a span of oxen and horses in that way! The oxen were wild for water, and could hardly be kept from the pit. Each was given three small buckets full; but the last did not get his till 2 A.M. on the 6th, long before which those watered early on the previous day were moaning for water again. They were, no doubt, in a sort of panic; for even when watered they would not graze, but stood bellowing with those whose turn was still to come. The water and suckers alike exhausted (for a considerable community had had to be supplied as well as my cavalcade), there was nothing for it but to inspan at once and make towards Maubelle. But as soon as the sun rose the oxen became mad and ungovernable; and though we had only done about 4 miles, outspanning was compulsory. Fortunately, there was the little hole here which I have previously referred to in connection with the word molopo. The only chance was that I should at sundown leave the waggon and three of the boys, and, taking the other boy, endeavour to drive the animals through to Maubelle. I should certainly have failed. The night was dark, there was no track, and the only notion I had of the direction of Maubelle was the pointing of the natives. About mid-day, to my intense surprise, L. and S. rode up to the camp

from the south, they equally surprised to see me, as they had thought I should be safely at Maubelle by the 5th. They were in bad plight; they had had no water for some time, and L.'s horse was at the last gasp. Finding no sign of track to Maubelle, they had come up out of the river-bed, and S. recognising the Maralilen kopje, they were trying to reach it. Our "molopo" and a barrel of water on the waggon saved them that extra journey. S. at once saw that my plan was the only one, but that he must go, and not myself. So at sundown he was off again with one of the boys and all the animals, except L.'s horse, which still had to be nursed at the waggon; and, thanks to his marvellous instinct and endurance, he succeeded in hitting Tsebūn, near Maubelle, though not till 11 A.M. next day. The distance was about 28 miles. He had to remain at Tsebūn for three days to recruit the animals (we at the waggon being meanwhile supplied with water by Sehetlani's wives, who brought it from Maralilen), and still had to leave three of the oxen behind when he started to come back. On the night of the same day on the morning of which he reached us, we trekked about 8 miles, on the next night about 12 more, and on the third day sent the animals forward once more to Tsebun, whence, returning, they took us safely through to Tsebun the same night. It was a disagreeable experience, and one which, though I do not pretend that we went through anything out of the common for travellers in the Kalahari, might, I thought, be of some interest.

It being quite clear that we could not get to Chwani from this side we went back to Morokweng as quickly as we could, going by Honing Vley, helping our oxen for the first third of the sandy waterless journey to that place by hiring a span of oxen at Maubelle for that distance. From Morokweng we went to Kanye, through Pitsani and Mafeking, for some little distance before Pitsani, closely following the line of the Molopo course when not actually in its bed. At Kanye we met a German trader who had already made two journeys to Luhututu direct from Kanye, and was about to attempt it again. We joined forces, but the drought drove us back when we got as far as Mesēken. The country west of Kanye, after one clears the rugged and picturesque hills near that stadt, is never destitute of trees, in clumps or belts, but it is fairly open; and the cattle at the posts looked splendidly. The sand was not quite so heavy as in the Mokopon-Maubelle-Honing Vley round. Secūma was supposed to be a good watering-place; but L. rode forward to investigate, and found it dry, while the German and the natives said that Kama, the next watering-place beyond Secūma, would not serve our purpose, as the water, when low in the pits—as it certainly was at this time—was unwholesome, often to the point of being fatal both to man and beast. Our German friend supplied me with the names of all his halting-places to Luhututu. I have not attempted to put more than two or three in the map, and the positions of these are quite uncertain.

The Bangwaketse extend as far as Kokong, and next to them, on the south and west, come the Western Barolongs, whose ground extends very nearly to Luhututu, and also comprises the places marked to the west of the river, excepting Maubelle and Tsebūn, which, though the waters there were first opened by Barolongs, appear now to recognise the Batlaro supremacy. Kang is universally recognised as Barolong; but I rather think Kangñoa must be meant rather than the Kang on the Luhututu and Molepolole route; as this Kang, if not under Sechele of Molepolole, must, I think, be under Maparo of Luhututu. The road between the two last-mentioned places is from a survey by Major Gould-Adams. I never travelled on it myself. It puts Luhututu more to the south than previous maps do, as my own map does also with regard to Kuis. It will, of course be understood that though the different tribes have very accurate ideas as to their respective territories—as to which the traveller judges best by finding out to whom the Vaalpense belong—no such thing as a physical boundary exists.

On our second journey in 1890 we began by going from Vryburg to Maubelle by Honing Vley. I had received concessions of land from Toto, chief of the Batlaros, and from Letlogile, chief of the Western Barolongs. Both told me that what they had given me was valueless, as, though the veldt (grass) was splendid, it would pass the wit even of the white man to find water. I had accidentally met at Vryburg Mr. W. H. Penning, F.G.S. well known in connection with the Geological Survey of England, and he agreed to accompany us to see if anything could be learnt about the geological formations. On this journey the rains were abundant, and there was water at all the places mentioned on the map, generally in open pools, but sometimes in pits. Everyone told us that we should never be able to cross the river, that it was running breast-high, and so on; but that in no way deterred us. For one thing, I did not believe it for an instant; for another, I thought how delightful beyond everything it would be to hear the brawling of water in that silent, sandy valley. Had this happened, we should, after seeing all we wanted near the crossing, have most certainly followed the torrent, and so settled once for all the course of this baffling Molopo to its junction with the Orange River. Alas! it was, as I expected, as dry as though water had not fallen or passed there throughout the ages. At Maubelle, however, where in 1889 the water was deep down in pits, it in 1891 overflowed the pits, the mouths of which were lost in a shallow surrounding pool. This lost me a good horse, for, going into the pool to drink, knee-haltered in the usual fashion, he fell into one of the pits and, his head being held down, he was drowned in a wretched hole not 20 feet in diameter. On reaching Mokopon again, we determined to strike out a new route direct to Sekeleke, and were fortunate in finding some delicious water midway at Kgetloa. This is only the name of a basin; there did not seem to be any stadt. As from Maubelle to Mokopon, so

from this latter place to Sekeleke, the country is densely covered with low trees, and from the hills at Maubelle, Tsebūn, and Ōkwān, the eye travels over an unbounded expanse of timber. Till roads are cleared, however, it is a great mistake to travel here with a large waggon requiring a long team of oxen. Sharp turns among the trees are incessant, and all the work of these falls on the four or six after-oxen, which are sorely tried, not aided, by the oxen in front pulling often almost at right angles to the waggon's line of advance. A broad-wheeled Scotch cart or light spring waggon drawn by six oxen is the proper conveyance, and for mere exploration, pack-oxen would be still better. Our oxen's necks were in such a bad state from the heavy pulling and twisting about on our arrival at Sekeleke, that it seemed better for me to return by easy stages to Vryburg; but Mr. P. and L. went off with Mr. P.'s light waggon to Honing Vley, anxious to get thence to Kuis, so as to ascertain its true position. This the ill-will of the natives at Honing Vley and Madebing prevented. They got as far as Madebing; but orders going forth that no guides or information as to water should be given, and no communications even held with them, they had to turn back. The loss of the horse was much felt here. If they had been able to make an attempt on horseback, as would have been possible with two spare horses, or even one, they would probably have reached it. The position of Kuis on the map is therefore only a guess, arrived at from the intersection of lines of direction indicated by natives at Tsebūn, Maubelle, Honing Vley, and Madebing; these last very likely given wrongly intentionally. There is no doubt, among a section of the natives, considerable jealousy of white men penetrating into the desert; but I fancy the dislike to Kuis becoming better known arises in great measure from its being a depôt of stolen horses, which are thence sent, as opportunity serves, to Namaqualand and Damaraland, to be exchanged for cattle. Whether Kuis is here placed anything like rightly or not, it must be somewhere to the south-west from Maubelle, and I do not think the position of Maubelle is far out. I think it certain that I am referring to the same place as that marked Kuis on all the maps, for there is no doubt as to its being a large Batlaro cattle-post with good pits, and a well-known halting-place on the desert road to Luhututu. There must, however, be several places of almost similar names, for one finds dotted about in maps and within a small area, Kuis, Kheis, Keis, and Kesa—this last a contribution of my own; and the natives also spoke to me of Kuisë, apparently referring to Kuis. The bulk of the natives, and most certainly the Vaalpense, whose homes are in the desert, would, I believe, welcome English settlers as meaning free work and wages, being well aware that the desert, thanks to the introduction of firearms, does not produce enough valuable game now to be of much account. There is not, indeed, much game now of any sort. We saw hartebeests, gemsboks,

springboks, wildebeests, ostriches, and of course steinboks and duïkers; but only the last two at all plentifully. West of the river, or, rather, as soon as the bush-country is entered, winged game is also scarce. I expect this is owing to the want of water, as, until we left the water behind us, partridges (more strictly, francolins), sand grouse or Namaqua partridges, pauws, koorhans of two sorts (the pauw and koorhan are both bustards), and guinea-fowls, were common enough. The temporary supply of water found on our second visit of course would not bring them into the heart of the bush-land; and besides, I fancy many of the gallinaceous birds are generally much more plentiful near habitations and cultivation.

I have used the word "desert" frequently, but as that name has already had to recede from British Bechuanaland and Griqualand, so I think it will shortly have to recede still further. It is true that most of the country west of, say, the longitude of Mafeking has a sandy soil, getting generally heavier as one goes west, and practically no visible water; but the sand, so far from being sterile, is covered with grasses, many of them well suited for stock; and where it is red, it produces, in years of good rain, or where irrigation can be carried on by means of reservoirs, magnificent crops of mealies and Kaffir corn. I have seen acres—I might almost say miles—of fields where I could not reach to the top of the plants. It must be admitted that the bulk of this more favoured ground is in the native reserves; yet there are very many good farms to be had still, on which laagtës or other depressions readily lend themselves to the construction of reservoirs, or on which water can be obtained from pits of no great depth. The objections that I see to settlers taking up such farms lie not so much in their not being likely to pay if well looked after, as in the want of English wives and white labour. As it is, the farmers' homes are not homes, and white men very rightly will not be fellow-labourers with the natives. The rainfall seems to get less as one travels west; but in the part of the Kalahari which I have more particularly attempted to describe, it is enough to cause the country, timber and bush-covered as it is, to look more like a park than a desert. The sand, however, sucks it all in, and unless it can be rediscovered by boring, I think the view of the chiefs as to the valuelessness of the country is correct. If, however, strong supplies could be tapped at distances of, say, 12 to 15 miles, or at such distances as stock can circulate between without loss of condition, I see no reason why the district should not carry very large herds of cattle and goats, and, after a time, of sheep also. The grasses would improve by being fed off, and improved grasses could be introduced. Haymaking, at present practically unknown in South Africa—anyhow, north of the Vaal River—might go a long way to prevent the loss of con dition from which all stock suffers in this country during the winter. It is not that there is no grass then, but it is brown and dry, and,

unlike the buffalo grass of the prairies, has then parted with most of its nutriment. In my opinion the district can never be an agricultural one, never even one in which it would pay to mark out separate farms, each of which would want to have water found for it. The only chance of utilising it (but that, I think, worth trying), is that a vast tract should be in the hands of a powerful company which could go to the expense of boring, and, if successful, of sending in stock and stockmen. The climate is marvellously healthy all the year round. On the water question I think I cannot do better than quote extracts from Mr. Penning's report:—

"There certainly is a scarcity of surface water in this region, as there is also in British Bechuanaland and in some parts of the Transvaal; but the Kalahari is not a 'desert' in the ordinary acceptation of the term, any more than are Bechuanaland or the 'high veldt' of the Transvaal. Comparing the Kalahari with those areas, we find similar surface springs in many places, the old stream and river courses now equally dry, and the land possessing the same natural fertility, while exhibiting a much larger proportion of bush and timber. After close observation I am convinced that in many localities the scarcity of surface water may be greatly reduced by shallow wells and by conservation; and in other parts (but not in all) a deep-seated supply of water may be relied on. *A priori*, it seems impossible that an abundance of timber and bush could subsist, or have come into existence, without a supply of moisture far in excess of that due to occasional periods of even heavy rain. Then there is the geological testimony; and the observations herein classified are reliable, although frequently taken at intervals widely separated owing to the uninterrupted stretches of sand which nearly cover this region. This sand presents the only real difficulty in the solution of the problem of water supply in the Kalahari. It masks nearly all the older surface features. It rests equally on siliceous, calcareous, and argillaceous formations (on the alternation of which depends the flow of underground water), and it forms a flat or gently undulating plain, though it must vary from a few inches to several hundred feet in thickness. It is doubtless a blown sand, as it presents no essential local differences except slight variation in colour, in this respect differing from sands locally formed, which in texture, coarseness, and colour, indicate the rocks from which disintegration has derived them. It generally happens that the evidence of water-bearing strata beneath a given point must be sought at a distance. It is so here, the rocks which outcrop in north-west Bechuanaland passing in by a westerly dip under the sand of the Kalahari. These rocks, fortunately, belong to series previously studied in the Transvaal and Bechuanaland, their continuity with which was readily established by a series of highly ferruginous magnetic shales, forming an almost (or quite)

unbroken geological horizon for several hundred miles. The formations in ascending order are :—

1. "Granite, the bed-rock of the whole country, a solid non-water-bearing mass, but having an undulated surface, in the channels of which water may and does accumulate, flowing out as small surface-springs. It comes to the surface about the head of the Molopo River, at Mosita, at Morokweng, and along the Mashowing River, near Madebing, sloping away westward under the Kalahari. It forms a solid substratum, holding up any water that may have escaped from the more permeable strata above.

2. "A series of hard crystalline siliceo-calcareous beds, occurring in great force near Kuruman, but thinning away northwards. It is only slightly water-bearing, except along lines of fissure, which frequently give rise to permanent springs.

3. "A series of highly-altered shales, very ferruginous and highly magnetic. They are so hard, and comparatively impervious to weather, that their outcrop forms a distinct escarpment, or 'krantz,' which can be readily followed for hundreds of miles; but, though hard, they are in thin beds, and much broken up, being thus fitted for the transmission of water, and the series is, in fact, the best water-bearing formation of the region. These beds may be seen all along their outcrop, which follows, and, indeed, forms, the range of hills from near Madebing, through Honing Vley, to near Sekeleke, and may be considered the proper physical boundary of the desert; for the deep sand begins immediately behind them. The escarpment exhibits numerous small springs that weep out from the bedding-planes, and it may be confidently assumed that this formation will yield water wherever tapped by wells or borings towards the west of its outcrop—that is, towards and in the Kalahari.

4. "This series uncertain, its outcrop being everywhere hidden by deep sand. It probably consists of alternating pervious and impervious beds, which (to judge from the Transvaal equivalents) are sandstones, shales, quartzites, and interbedded traprocks.

5. "A large series of hard, impervious quartzites, forming the ranges at Maubelle, Tsebun, and Mararalen, and seen, also with westerly dip, at the great southerly bend of the Molopo, near Mokopon. These quartzites hold down the water that is held up by the granite, and if penetrated by deep borings, should give rise to true artesian wells.

"It has not been possible yet to decide on the thicknesses of the formations—in other words, the depth to which borings must be carried—or to take accurate levels for determining the height to which water would ascend in such borings. There are however other sources of supply, possibly, for the moment, of even more importance. It will have been gathered that the desert sand masks all the older surface-

features of the country, the chief of these perhaps being the old channel of the Molopo. At one time this must have been a large river, carrying all the waters of the region and the waste of its rocks to the Orange River. Now no water flows visibly along its course save for a few miles below Mafeking; but it passes under the sand, as in many other cases, as, for instance, in the Mashowing River, where, with no visible water, a small hole in the sand, only a foot or so in depth, discloses excellent water—not stagnant, but gently passing along. This must happen also in the Molopo, but on a much larger scale, having regard to its enormous collecting area, the rainfall on which must go somewhere; and there seems no other possible mode of its passing seawards than through the lower part of the blown sand now filling its *old* channel. The more recent course of the river follows somewhat, but by no means exactly, the original channel, which is indicated here and there by earthy limestone deposits, found first on one side, then on the other, of the modern channel (now dry) of the Molopo River. There are thus two distinct sources of supply here: first, the underground waters passing through the sand beneath the thicker parts of the limestone, which should yield a good and constant flow at a depth much less than that of the deep-seated springs; second, the present bed of the river, which is saturated at a small depth, probably throughout, but certainly in numerous places, as shown by the many small pans, sometimes full of water, in other cases covered with water-grasses and rushes.

"It will doubtless be urged that hidden waters do not exist in a (so-called) desert region almost destitute of surface springs, and in which, for a good part of the year, the natives rely upon sucking-pits and wild water-melons for small supplies of water; but the actual existence of even a few springs, and possibly even the growth of the melon, and certainly the growth of trees, indicate that there is water below the surface. Further, natural laws must work in the same manner all the world over, however their results may be modified by local conditions; and the rainfall of any district must either flow away by visible rivers or by underground channels, or be received into permeable strata below. The annual rainfall has not been ascertained."

As to this last statement, I have recently been told that the rainfall is at Vryburg about 28 inches a year. In the summer of 1890–91, a season of unusually abundant rain, it was 50 inches. One word more on a point as to which enquiries are always made in connection with Bechuanaland—viz., its mineral wealth. Personally, I saw no indications of minerals, but yet the chances seem much in favour of their existence. Gold has been found in considerable quantities at Malmani, in the Transvaal, close to the British Bechuanaland frontier, though I believe the results of working it have been disappointing. It has also been found at Kuruman and

Mosita, but in nothing like payable quantity. Boring for water—and without water no mining operations on a large scale could ever be carried on—may quite well lead to the discovery beneath the monotonous sand of strata and minerals of which no surface indications can ever be given.

After the reading of the paper the following discussion ensued :—

Mr. H. A. Bryden: I am afraid I am not prepared to make many remarks, but I can bear testimony to the able paper we have listened to in this respect, that there is a great future for the Kalahari in the way of cattle farming. To effect this, however, British money and British enterprise must find their way into the country, and well-sinking be carried out on a large scale. Beyond this, not much can be done with it, although, as a cattle country, it is so fine. There is good grass and plenty of timber, but there is little or no surface-water, and extensive well-sinking operations must be undertaken before the country can be developed. I have seen much of the country, both north and south, during the last two years, and consider it admirably adapted for ranching.

Mr. R. St. Stephens: I have had the pleasure of travelling in this country, and can bear Mr. Wilkinson out fully as regards the splendid pastoral prospects in the districts between Mafeking and Vryburg, and in the direction of Morokweng, where magnificent plains, covered with fine grasses, are to be found. I was hoping to hear some report by Mr. Penning, who is a distinguished geologist, as to the mineral products of the country. Mr. Wilkinson said he had been unable to see any signs of precious metals. I can only say that, after wandering over the country for a year or two between Vryburg, Morokweng, and Mafeking, I never saw any trace of gold or a lode of any description, and I take it that it is geologically impossible, as the whole country is granitic gneiss. I say this more strongly, because I see in the prospectus of a Company, issued last Saturday, it was stated that, in the very place where Mr. Bryden and I had made extensive researches without finding any indications, there were rich lodes giving as much as four ounces to the ton. This is a great shame, as there is no lode in the country, and I take it that Mr. Penning would confirm the statement I have made as regards the lack of auriferous wealth in the country.

Mr. Wilkinson: The report by Mr. Penning, which I have in my hand is simply a statement of the sequence of the geological strata, and does not touch on the question of gold; I had, however, many conversations with Mr. Penning about it. He had been to Kuruman and Mosita, where gold is said to have been found, and his opinion was that it was far from being payable, and that it was madness to think of getting up companies or attempting any work on the strength of any indications that he saw there. I do not think he expects much gold to be found in that part of Bechuanaland. Boring to reach water in what is called in this paper the third series of rocks, a series traceable also in the Transvaal, may bring something to light in the at present unknown series which overlies it to the west, but my own impression is that the gold is not on the west or Kalahari side, but on the east side, if not of the frontier, yet at least of the outcrop of that third series.

The President: I think you will instruct me to close the proceedings by returning your very best thanks to Mr. Wilkinson. I think he is likely to return to Africa, and I hope when he has made further explorations he will again give us the pleasure of his company and the advantage of his information.

Map of the Kalahari.—This map is based on a map prepared by Mr. Wilkinson. The longitudes of Vryburg and Genesa were supplied by the Surveyor-

General of British Bechuanaland. That of Morokweng was fixed by chronometer, and is the mean of two visits. Since the publication of his map in *Petermann's Mitteilungen*, Mr. Wilkinson has thought it necessary to allow a somewhat different rate for his chronometer, and has recalculated the longitudes, but they must only be regarded as approximations. Latitudes were fixed by observations for meridian altitudes of the sun. The altitude of Maralilen on the map in *Petermann* (25° 39′ S.), is from an observation taken in 1889. In 1891, however, when they reached Kesa from the south, a native who had recognised them, assured them that Kesa was the place where the waggon halted the night previous to the oxen being taken to the sucking pits at Maralilen. Mr. Wilkinson himself did not recognise it, but if it were so, it is clear that Maralilen cannot be north of Kesa, or they would have come to it first. Mr. Wilkinson therefore places Maralilen on the same latitude as Kesa. The geological features and some topographical details along the course of the Molopo are from a map by Mr. W. H. Penning, F.G.S.

THE SANDGATE LANDSLIP.

By W. TOPLEY, F.R.S.

The sea-front of the coast near Folkestone, Hythe, and Sandgate has long been known for its tendency to slip, and numerous examples of landslips, small and large, are there to be seen. In all these cases the cause of the slip is the geological structure of the ground, the strata consisting of alternations of pervious and of more or less impervious beds. At Eastwear Bay, between Folkestone and Dover, there is a huge tumbled mass of chalk, known as "The Warren," which has slipped over the impervious gault clay. As we proceed from east to west along the shore lower strata occupy the surface. Folkestone is mainly built on the highest division of the lower greensand—sands, sandstone, and hard calcareous bands, known as the Folkestone beds; these underlie the gault, and they overlie a set of clays and sandy clays known as the Sandgate beds. Where the latter beds crop out the old landslips begin, and they continue westward along the shore.* The town of Sandgate is built on an old landslip of the Sandgate beds, and the recent slip is only a small movement in the old slip. West of Sandgate the Hythe beds rise from beneath the Sandgate beds. These are bands of limestone and calcareous sandstone; they rest on Atherfield clay. The Atherfield clay, along its whole length for many miles to the west, has slipped more or less over the weald clay which underlies it, often bringing down masses of the overlying Hythe beds.

Three miles to the west of Hythe are the remains of Studfall Castle,

* Accounts of a landslip between Folkestone and Sandgate, which forced up the rocks along the shore, are given in the *Phil. Trans.* for 1716, p. 469, and for 1786, p. 220.

a Roman fortress built on the slope of the hill on Atherfield clay. This castle was destroyed by a landslip which probably occurred before the Norman Conquest. In *The Gentleman's Magazine* for 1756 (vol. xxvi, p. 160) there is an account of a landslip which occurred near this place in 1725. The slip occurred during a very wet season. A farmhouse sild down about 50 feet during the night, so gently that, it is said, the people inside were not aware of what had happened until in the morning they were unable to open the door. A similar gentle movement of the ground is apparent at Sandgate, where, during the recent slip, a greenhouse was wrecked, but it fell so slowly that most of the glass was unbroken. Slips frequently occur along the Atherfield clay near Hythe. Small movements of this kind occurred at the same time as the recent Sandgate landslip.

Behind the town of Sandgate there is a high cliff of Folkestone beds, below which come the Sandgate beds. At the western part of the town there are the Hythe beds, which also appear as rocks on the shore in front of the town. The dip of the strata is towards the north-east; the normal dip is gentle, but high dips are sometimes seen which may be due to slips. A deep cutting for a sewer is now open on the slope near the centre of the town. The effects of the old landslips are evident here, for below sandy clay of the Sandgate beds there are masses of peaty stuff containing recent plants. This old landslip must have been far more extensive than now appears, for its seaward front had been worn back by the waves before the town was built.

Special local causes may possibly have some influence in determining the exact position and origin of any landslip along this coast; but the main cause is always the same—the saturation of the land by heavy rains. The nearest rain-gauge to Sandgate is that at Hythe, where observations have been taken for many years by Mr. H. B. Mackeson, F.G.S. The average rainfall for February at Hythe, during the ten years 1883–1892, was 1·95 inch, with 13·8 wet days. This year the fall was 4·3 inches, twenty-four out of the twenty-eight days being wet; 1·06 inch fell on one day (February 21st).*

The Sandgate beds, in their undisturbed state, are only moderately retentive of moisture, from the large amount of clay which they contain; but when in a slipped and broken condition, as at Sandgate, they can contain a great deal of water. The recent excessive rains saturated the ground, and rendered the whole mass unstable.

The recent slip took place along an area 2775 feet in length, with a maximum breadth of 700 feet, measured from the back of the Encombe grounds to high-water mark. The foreshore was also moved for a breadth

* In Symon's *Monthly Meteorological Magazine* for March there is an account of "The Sandgate Disaster," giving details of the February rainfall in East Kent, the fall varying in six stations from 3·06 to 4·30, that at Hythe being the largest.

of perhaps 300 feet, making about 1000 feet in all. The extreme eastern limit is at the eastern end of the coastguard station; the western limit is just opposite the centre of the Military Hospital. The greatest vertical movement seems to have been about 10 feet—this is in the Encombe grounds; the horizontal movement of the slip is also small. The maximum effects are to be seen in various places in and near the Encombe grounds; fortunately, there are few buildings here.

The rocks on the shore were slightly moved, a bed of clay being ridged up about 4 feet. This movement of the rocky Hythe beds, and of the clay lying near, was probably due entirely to pressure from the moving mass of Sandgate beds.

As a "landslip" the movement is a comparatively small affair, and would have attracted but little attention were it not for the damage to houses; this, unfortunately, is large. No dwelling-house actually fell, but many are so much injured that they must be taken down.

The prevention of future slips is a simple matter, though necessarily a costly one for so small a place. Deep drains must be carried along the back of the undercliff, to carry off the water percolating from the Folkestone beds above; the undercliff must also be thoroughly drained, and no surface-water, other than that due to the rainfall on the area itself, must be allowed to enter the ground. This is the plan recommended to the local board by Mr. Baldwin Latham.

Much has been said about the probable effects of blowing up two wrecks off the shore—the *Calypso* in June 1891, and the *Benvenue* between September and December 1892. But any effect due to the former should have been felt long ago. The vibrations caused by the *Benvenue* explosions seem to have been no greater on the shore than those made by heavy storms at spring tides; but they of course shook the land behind more than such storms do. It is impossible to say that these explosions had no effect in rendering the land more unstable; but sufficient other causes for the landslip are apparent, and similar though smaller slips occurred along the coast in other places where these explosions could have had no influence whatever.

Another cause which may have partially assisted is the want of shingle on the foreshore. A sea-wall with groynes has been built on the east of Hythe; this largely stopped the eastward movement of shingle, and the sea-front of Sandgate suffered. New groynes have, however, now been built here and the shingle is again accumulating. If the want of shingle were the real cause of the slip its effect ought to have been felt some time back in wet weather. The want of support to the foreshore may possibly have had some effect in determining the exact time of the slip, when the ground became fully saturated, for the first important slip occurred at 7 P.M. on Saturday, March 4th, at low spring tides; the ground moved slightly during the night, and a second slip took place at low tide the next morning.

CHILAS.

By General Sir MICHAEL A. S. BIDDULPH, K.C.B.

As attention has been directed recently to fighting in Chilas, it seems well to put on record what we know of this remote corner. To define accurately where lies Chilas, let us describe concisely the main features of the road from Kashmir to Gilgit. Leaving the valley of Kashmir at Bandipore, a high ridge is crossed, and the road traverses the plain of Gurais. Then following the valley for a few miles—this part highly dangerous from avalanches in the spring—it crosses the Kamri Pir,* over 14,000 feet, and follows the Astor waters to the Indus, at the foot of the Hatu Pir. Hence to Bunji, the ferry over the Indus, the road coasts along the river for about a march, exposed in this part by the vicinity of the Yaghistan border, and the raids of the Shinaki tribesmen. It is not necessary for our purpose to follow the road any further. At the ferry we are eighteen marches, and at Gilgit twenty-two marches from Srinagar. As the crow flies it is only 130 miles, but about 100 miles are added by the windings on the way. Exactly opposite the foot of the Hatu Pir, on the right bank of the Indus, is Taliche, the extreme limit of Yaghistan, which extends all the way up the river from the Black Mountain to this point. At this place a small fort has lately been erected, and a garrison detached from Gilgit holds it to guard the exposed road above described. The tribesmen of Chilas, and those in concert on the right bank, have free access to Taliche,† and recently fired on our troops, and wounded an officer near Bunji. It is believed that the recent attack of the tribesmen was against our detachment at Taliche.

Descending from the Kamri Pir, about a march short of Astor village, a road turns due west up a branch valley, which is blocked by the magnificent mass of Nanga Parbat, 26,620 feet. As the floor of this valley is only about 8500 feet, perhaps here is seen the most remarkable and beautiful view of a great mountain in the world. Tashing, at the foot of the mountain, is the last village on the road, which, following a glacier valley—Rupal Nala—right under the highest peak, turns the Nanga Parbat, and gains the Chilas country by the high and difficult Mazeno Pass. Thus the Chilas country lies on the north slopes of Nanga Parbat, which, with its huge limb stretching to the Indus, forms its east and south boundary. Chilas continues to touch Kashmir territory on head-waters flowing to the Kishn Ganga, and here there is

* The new road goes over the Burzil or Dorikhun Pass. There is a summer track over the Kamri.

† The people of Taliche make common cause with those of Chilas, of whom they are an offshoot.

a pass to Shardi. Then Chilas touches British territory on the passes into Khagan, of which the Babu sar gate is the most practicable. Seven marches lie between Khagan and the village of Chilas. On the western boundary Chilas is open to Yaghistan, and on the north it touches the Indus.

The country of Chilas, where it borders on the Indus, has only an elevation of 3400 feet. It is described as bare and treeless. Previous to our recent occupation no European traveller had ever visited Chilas, and we know little about the topography and climate. It is likely that the vast elevated snows of Nanga Parbat drain all the clouds, and that the country of Chilas is practically rainless. Hemmed in as Chilas is by very elevated mountain ranges, only reached from the outside world by passes open only for a few months in the year, the difficulty of access has given the people a spirit of independence and a distinctive character. They have been determined raiders from all time. Vigne describes the raids of the Chilasis, which, laying under contribution all neighbouring valleys, extended into Kashmir itself. During the Sikh occupation an expedition sent against Chilas met with a disastrous defeat. In 1851 the Maharaja Golab Sing, with permission of the Government, exacted reprisals for a successful raid. Two columns entered Chilas, one by Shardi in the Kishn Ganga, and one from Astor by the Mazeno Pass. The Chilasis were defeated, made submission, and afterwards paid tribute, and sent hostages to Srinagar; since then they have been more or less quiet. In 1865 we found, however, that the villagers of Tashing had still a terror of the Chilasis, and even then there was a piquet kept in the Rupal Nala on the look-out. We noticed several men maimed and wounded in conflict with their warlike neighbours in defence of their families and property.

With such hardy and practised raiders immediately on the flank of our military road to Gilgit, it is necessary to hold the posts with a strong hand; any relaxation would invite certain disaster.

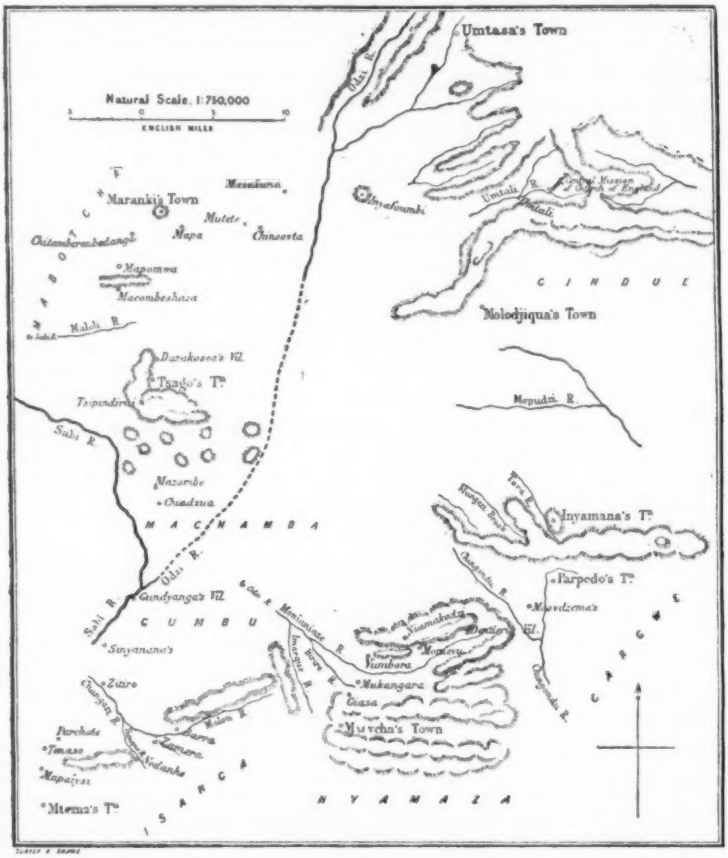
We gather from the latest account that the recent fight was at Taliche, and not at Chilas itself. However, it seems that we are in possession of the Chilas village. It therefore now appears not only possible, but an urgent measure to connect Gilgit with Abbotabad by means of a road *viâ* Khagan, thus saving some ten to fourteen marches. Besides Chilas, there are other valleys of the Shinaki country which have at one time or another been brought under subjection by the Dogra troops. These are on the right bank of the Indus Darel, Hodar, and Gor; but viewing the lightness of the bond—there being no troops or officials resident—they are always ready to make common cause with Chilas.

Between the Black Mountain and Nanga Parbat the country is sealed to the explorer, and the map shows topography in this direction at a standstill.

THE COUNTRY EAST OF THE JUNCTION OF SABI AND ODZI RIVERS.

By the Right Rev. G. W. H. KNIGHT-BRUCE.

THE accompanying map represents little more than a route-survey made by me during a walk through the country to the south of Umtali. The



interest lies in the ground apparently never having been mapped before. In character it is much the same as the corresponding country on the north of the Mashonaland plateau, but far more beautiful, and apparently far more fertile. Some parts of the country are quite the most beautiful that I have seen in Africa, and the natives seem fully alive to the

capabilities of the ground. The position—between the Matabele and the Gaza people, and at some distance from both—may have saved them from hostile raids and the destruction of their labours; and this may account for the very large herds of cattle that are seen in the neighbourhood of the villages along the River Sabi. The people consist of many tribes. In this especial walk I passed seven. Their occupations are somewhat different to the people on the uplands. They are fishermen; they get salt from their saltpans and rivers; in places their customs seem affected by the coast people.

The trees and general herbage seem much the same as in the Zambesi Valley, in some of the lower ground the sickly-looking yellow "fever-tree," as it is called on the East Coast, being very common. The baobab grows in as great profusion as in the Zambesi Valley.

A marked feature of the country is the succession of small valleys in much of the country to the east of the junction of the Odzi and Sabi, the path going for miles over a succession of saddles and through small valleys, a feature I have not seen in any other part of Mashonaland. The nights here in August were hot and sultry, while in Umtali they were cold and bracing. Though the people were very hospitable, I should say that the country of higher Mashonaland, *i.e.*, the country to the north and west, was more fitted to Europeans.

NOTE.—The map is a reproduction, on a reduced scale, of Bishop Knight-Bruce's sketch-map, adapted to Mr. Swan's positions and survey as published in the R. G. S. *Proceedings*, May, 1892. All the remainder of the map contains entirely new work.

A GERMAN COLONIAL ATLAS.*

THE great extension of the colonial possessions of Germany during the past few years has been so rapid, that the necessity for some such atlas as that which has now been published by the well-known firm of Deitrich Reimer, is fully recognised. The maps have been prepared under the superintendence of Dr. Richard Kiepert; they are five in number, and consist of a map of the world on Mercator's projection, showing the colonial possessions of European Powers, with smaller maps to illustrate the extent of the German consular and diplomatic services, and the lines of German mail steamers. This is followed by maps of Western Equatorial Africa, with an inset on an enlarged scale of the Cameroons; German South-West Africa; Equatorial East Africa,

* Deutscher Kolonial Atlas, fur den amtlichen Gebrauch in den Schutzgebieten, von Richard Kiepert. Begleitender Text von Dr. Joseph Partsch. Berlin, 1893. Geographische Verlagshandlung. Dietrich Reimer.

with an inset plan of Dar-es-Salaam; and the German possessions in the Pacific Ocean. All of these maps are fine specimens of cartography, and, having been carefully brought up to date, are valuable, not only as showing the extent and position of the German colonial possessions, but also for general purposes of reference with regard to any country within the area they embrace. The letterpress which accompanies the maps is by Dr. Joseph Partsch, and contains statistical information and notes on the climate, products, &c., of each of the countries over which the German sphere of influence extends, whilst the value of the atlas is increased by the copious index with which it is supplied.

BRAZILIAN EXPLORATION IN THE AMAZONS VALLEY.

THERE exists at the Aix Seminary, in the French department of Bouches-du-Rhône, a Latin manuscript containing the description and itinerary of an ancient journey performed by Jesuit missionaries from the River Orinoko to the River Plate, through South America. Father Nicolino, a Brazilian, while studying at Aix, found, in the document referred to, the description of vast plains to the south of the Tumuk-Humak Range, and of British, Dutch and French Guiana, in the Amazons Valley. In this manuscript a tribe of White Indians is spoken of, which was also found there by Monsieur Coudreau in 1885.

Guided by the Aix Manuscript, Father Nicolino started on November 20th, 1876, from the Lower Trombetas or Oriximina, the affluent of the Amazons above Obidos, got a view of the plains at the base of the Tumuk-Humak on January 25th, 1877, but did not find any Indian village, and had to turn back for lack of provisions. He tried to return the following October traversing the forest, but was again obliged to retrace his steps. In 1882, whilst engaged in a third expedition, Father Nicolino died of yellow fever.

The River Trombetas, beyond the confluence of the Kuminyan, is very little known. Within the last twenty years some five or six expeditions, besides those we have mentioned, set out from Obidos to explore it, but never returned. The River Trombetas appears to be formed by the confluence of two considerable systems, one to the north-west, the other to the north-east. The higher system, that to the north-west, was explored in 1885 by M. Henri A. Coudreau, starting from the Rio Branco (confluent of the Rio Negro). The farthest branch is, in this direction, the Kurukuri. An affluent almost parallel with the Kurukuri, the Apiui, connects the Trombetas, and therefore the Amazons Valley, with the Essekibo, which runs northward, and, as is well known, discharges near Demerara, as in like manner the Rio Negro, the next largest affluent of the Amazons, communicates, farther west, with the Orinoko, by means of the Casiquiare.

In 1890 a vast overflow of the Amazons devastated the plains whereon the cattle of the Obidos district are reared. The government of the Brazilian province of Pará thought, at that time, to re-discover the means of communication with the plains found in ancient times by the Jesuits, and it dispatched an expedition under the engineer Gonçalves Tocantins. On October 6th, 1890, the expedition set out from Obidos to reach the mouth of the River Trombetas, ascended this river as far as the mouth of the Kuminyan (the Portuguese, Spanish and Brazilian orthography is *Cumina*, *Cuminhan* and *Cuminã*). The first section of the Kuminyan is of almost

impossible navigation on account of the rocks and waterfalls, whereon the expedition's canoes were broken up. They then journeyed through the forest until able to construct a canoe from the bark of the Tapari tree. In this they travelled by way of the Urukuriana (an affluent of the left margin of the Kuminyan) for a period of ten days. The banks of that river are covered with dense forests, and colossal trees which had fallen across the stream had frequently to be cut away with hatchets to enable the expedition to advance. As fever began to assert itself, the expedition returned as far as the Kuminyan, which it continued to ascend. Then it was that, on the left bank, they saw an Indian village, the inhabitants of which fled as they approached. The expedition left presents for them and withdrew. When it returned the presents had been secured, but the Indians continued hidden. In the village there were tools, evidently obtained from the Dutch colony of Surinam to the north.

On November 28th the expedition at length arrived at the sought-for plains. Adjoining the Kuminyan, and rising 1300 feet above it, was a hill, from the summit of which could be seen grassy plains free of forest for a great expanse. To the north the Tumuk-Humak Range was seen to stretch east and west; to the south the forests extended as far as the Amazons, and eastward the plains seemed boundless.

Senhor Tocantins judges them to stretch as far as the Rivers Aporuna, Arapuari, Ausapá, and Oyapok, that is, as far as the slopes whence rivers flow direct to the Atlantic. Westward, also, the confines could not be discerned, and Senhor Tocantins believes the plains to stretch beyond the Rio Branco. On these highlands several treeless but grassy hills rise. The entire plateau is watered by numerous streams. At this point the Kuminyan is 820 feet wide, and is perfectly navigable, being intercepted by no waterfalls. At the period of Senhor Gonçalves Tocantins's journey northerly winds were prevalent, the climate was temperate and, to all appearance, salubrious. The plains appeared to be suitable for the rearing of enormous herds of cattle.

THE GEOGRAPHY AND SOCIAL CONDITIONS OF THE IBERIAN PENINSULA.*

By Professor THEOBALD FISCHER.

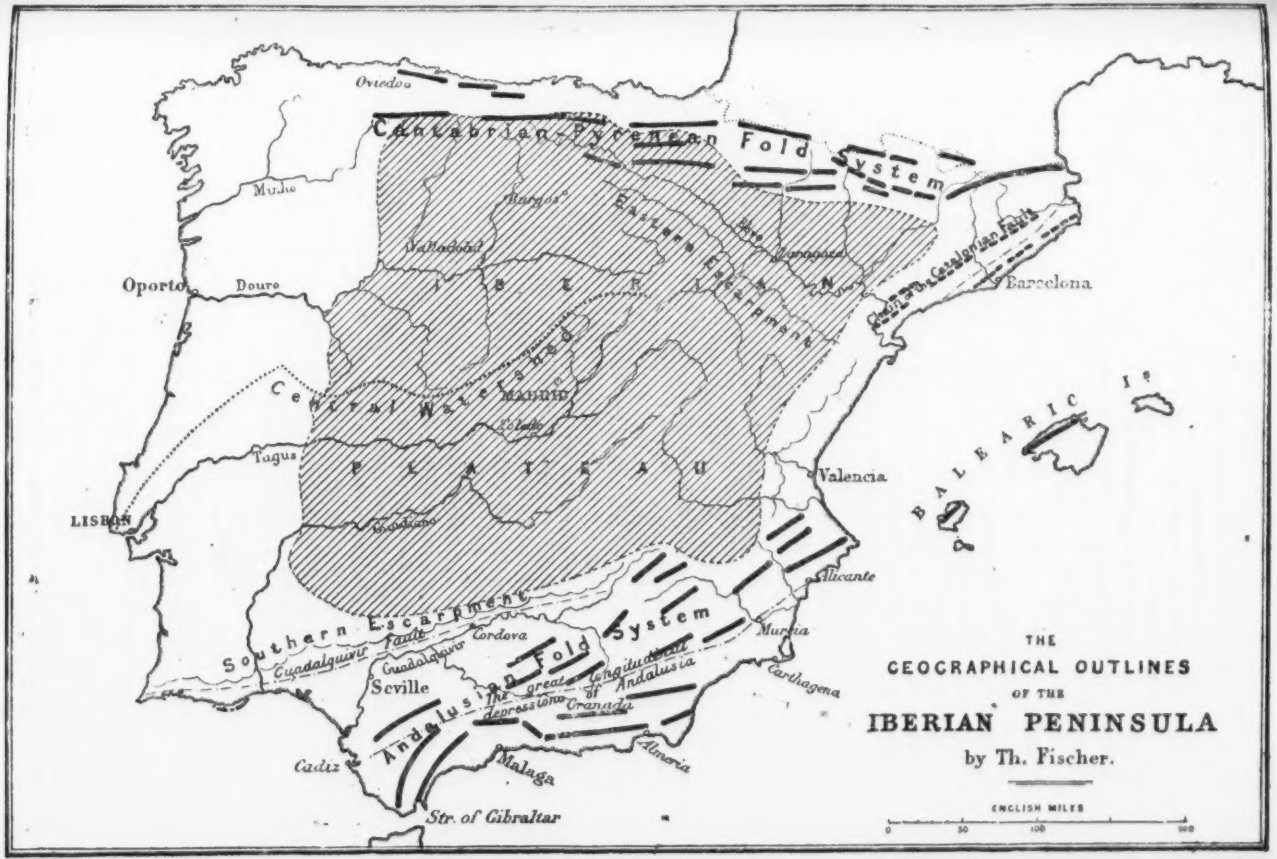
THE Iberian Peninsula is a region of contrasts, and although it is surrounded by the sea for seven-eighths of its borders, it possesses in the main the features of a country having little connection with the ocean, and a climate which, although wonderfully varied, is preponderatingly continental, in spite of the fact that the country only extends over eight degrees of latitude. The peninsula includes districts with a rainfall as great as any in Europe; with forests and meadows green in summer; the inhabitants of which drink cider: and also regions with a smaller rainfall than any in the world, where a harvest is only possible with the aid of artificial irrigation, and where the sugar-cane and date-palm flourish close beside the most fiery wines. Shut off from the outer world the peninsula, by virtue of its surface formation, possesses such marked contrasts in landscape with corresponding economical and ethnical contrasts, that it appears incapable of being welded into a political unity. The principal physical characteristic of the peninsula is the Iberian

* Report of a paper read before the Geographical Society of Berlin on March 4th, 1893.

table-land, which is composed of archaïc and palæozoïc rocks, and which at the end of the carboniferous period was "folded" together into a gigantic mountain-range of Alpine character, of which to-day only the ground-work remains. To this have been added later two formations, widely different in plan and style, viz., the Andalusian "fold" system in the south and the Pyrenean-Cantabrian in the north. It is almost as if two side-wings had been added to an old regular Doric temple in the shape of two elaborate Gothic domes. The precipitous and narrow coast border which has no adjacent islands or opposite coasts, and the shallow highland streams of which do not afford any means of communication with the interior, is unable to produce a good sea-faring population, except in Catalonia and on the Balearic Islands. The maritime trade has been naturalised by the outside aid of Genoese ship-builders and seamen. As early as the beginning of the fourteenth century the nautical training of the people was systematically taken in hand by far-sighted rulers in Portugal with the assistance of Italian captains and pilots.

The high central region, which is almost completely encircled by mountain walls, exercises in summer an influence through its heat upon the climatic conditions of the whole peninsula, and gives the latter in short a tone which reminds one of Asia. The districts situated on the edge of the peninsula, with the exception of those in the south-east, viz., Valencia and Murcia, have a maritime climate, while the interior regions have a continental climate, a hot summer, a cold winter and excessive drought. These climatic contrasts serve to intensify those of the surface formation. In the outer territories where the rock formations are more diverse, the well-fed rivers and streams have an extraordinary power of erosion, owing to the steepness of the mountain slopes; in all directions the country is intersected by deep, narrow valleys; the relief of the land is so full of variety that, for example, in Asturia, the surveyors found great difficulty in securing a level tract ½ mile long for measuring a base for the triangulation of the country. On the tableland, on the other hand, there is but little erosion, owing to the small rainfall and the very slight variations of level; this region is a series of monotonous plains, over which one might, as in La Mancha, travel for hundreds of miles without varying one's height above the sea-level more than 150 feet. In the outer regions there are murmuring brooks, green meadows, cool forests of beeches, oaks, ashes, chestnuts, and fern-covered rocks overgrown with ivy; in the interior we find shallow, sluggish streams, which possess no eroding power, and at times lose themselves in swamps. On every piece of rising ground are mounted the classic windmills of Don Quixote by way of compensation for the want of water power; in some places there is a complete absence of trees, and the bare gypsum and salt steppe prevails; in others the plain is covered with low thickets, which although poor in foliage, can boast of fragrant and beautiful flowers. These contrasts are found generally so close to each other that their effect is all the more striking.

The marginal districts are everywhere the seat of a flourishing agriculture which has reached a high state of development, but which, being carried on mostly with the hoe, on the numerous small properties or farms, partakes rather of the character of gardening; in the coast territories along the Mediterranean a wonderfully developed system of artificial irrigation is very largely employed. The diversity of the vegetables cultivated, the abundance of fruit-trees of the most varied kinds, give one the impression that the country is one huge garden, and stamp the outer regions of Catalonia, as far as Andalusia, as a girdle of "Huertas." The attention paid to manuring the soil with every kind of refuse obtainable reminds one of China. In Murcia the irrigated territory is thirty-seven times greater in extent than the non-irrigated; the value of the land is as much as £16 an acre, while for orange gardens in the coast plains of Valencia £300 to £400



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and even £500 is paid. In view of such prices of land the population of these outer regions can hardly be charged with laziness and backwardness. The worker, as a small farmer, receives a very small portion of the result of his labour, and he lives often in a lamentable state of poverty opposite to the magnificent estate of his landlord in the most luxuriant Huertas. In these purely or chiefly rural provinces one is not surprised to find that there have already been socialistic disturbances.

Among the articles of export from Spain, vegetable products easily occupy the first place; they comprise about 66 per cent. of the total exports. But the border regions contain other treasures. As the Phœnicians, and after them the Carthaginians and the Romans filled their treasure-chests here, so to-day the peninsula is once more one of the first mining countries in the world, and is surpassed by none as regards the variety of its mining products. The treasures of America caused the mineral wealth of the peninsula to sink into oblivion for a time, but the foreign spirit of enterprise and foreign money and skill have once more brought Spanish mining into a flourishing condition. The £5,200,000 to £6,000,000, which represents the value of the annual output of Spanish mining products, comes almost exclusively from the regions on the borders of the peninsula. Spanish industry has in the same way its centre exclusively in these districts, where it receives great assistance from the water-power at hand. The economical weight of Spain lies in its peripheral parts; all the large cities of the country, with the exception of Madrid, are situated in the border regions, which although occupying only 45 per cent. of the entire superficial area of the peninsula, contains 66 per cent. of the population. The inhabitants of the central districts carry on agriculture and cattle-rearing exclusively, limited, however, almost entirely to the cultivation of wheat and sheep-breeding. The settlements in this part of the country possess no attractive features, not even a strip of garden ground. They are situated in the bare plains, often at a distance of from 12 to 18 miles from each other. These towns are in hardly any case wanting in historical interest and in attractive buildings, but in all directions the evidences of decay are seen; for instance, entire streets or a whole quarter will be found in ruins; it is almost only in the capital that new buildings are seen. Wide stretches of country, covering thousands of square miles, lie waste; to the south-west of Toledo, for example, a whole province of about 2000 square miles is completely uninhabited—the notorious Despablados. Everywhere one finds stagnation, retrogression, desolation, depopulation, so that it may well be doubted whether the assertion of a Spanish patriot that Spain is the richest country in the world, because the Spaniards had been endeavouring for three hundred years to ruin it without having attained their object, is still correct. The great contrasts in the nature of the country are expressed also in the political geography, because at no time, except as a member of the Roman Empire, has the peninsula been politically united. Portugal, as the most independent and individualised of the outer territories, has managed to preserve its independence to this day.

THE LAKES OF THE EASTERN ALPS.

Several papers by different writers have recently appeared descriptive of the lake-basins of the Austrian Alps, with special reference to their mode of origin.

In the *Mittheilungen* of the Vienna Geographical Society (xxxv., p. 471), Josef Damian gives the full results of his investigations into some of the Alpine lakes in the neighbourhood of Trient. The greater number of these belong to

the class of obstruction lakes originated by the formation of a dam across a valley, though rock-basins also occur. The lakes of Cavedine, Toblino, and Santa Massenza, in the valley of the Sarca, the feeder of Lake of Garda, are good examples of the first class. The three lie at the eastern side of the valley, separated from the river by a vast field of *débris* over 320 feet in thickness, which fills the whole valley for a distance of 4½ miles. The Lake of Cavedine, which is drained through this *débris*-wall into the Sarca, is separated from that of Toblino, which drains into it by a plain 2½ miles long. Exactly opposite this plain the Sarca breaks by a transverse valley through the mountains, and were it not now confined by walls, would continue to raise the level of this plain by depositing its sediment on it. The two upper lakes, originally one, have been separated in recent times by the deltaic deposit of a side stream. The general result of soundings in these and other lakes is to show that the inclination of the bounding walls is the same below and above the surface. The side walls as a rule fall steeply into the lake (often to a nearly level bottom covered with mud), while at the ends the slope is more gradual. The steepest slope occurs, in the Lake of Cavedine, on the side of the *débris*-wall, the loose materials being continually undermined by the waves.

This *débris*-field in the Sarca valley, like the better-known but smaller one in that of the Adige, has been the subject of much controversy. From the traces of glacier action found, Paglia and Amboni pronounced it to be a terminal moraine. Damian, however, supports the view that it is the result of a vast landslip. Signs of glacier action are common in the whole district (in fact they diminish as one approaches the locality in question), and would naturally be found in the *débris* of a mountain side; besides that, real moraines may exist beneath the fallen materials. The fact that the materials are more crushed below, while large, sharp-cornered blocks are found above, the piling up of the *débris* on the side away from that whence they fell, and the poverty of vegetation, are all characteristic of landslips, while the places from which the masses have fallen away are plainly visible on the side of Monte Casale.

The romantic Lake of Tovel, 3820 feet above the sea, situated in a deeply-cut, wooded valley in the Brenta group, and that of Tenno near the head Lake of Garda, are both dammed back by undoubted landslips. The outlet of the former, like that of the Lake of Molveno, flows for some distance beneath the masses of rock which form the barrier. Examples of rock-basins in the district are found in the Lake of Terlago, and two others enclosed in a deep valley without outlet on the mountain of the same name. The former occupies a hollow above the pass of Cadine, the outer edge of which falls steeply to the Adige. The shores sink gradually to the water, Jurassic and other strata with a gentle westerly dip, being exposed to view in many places. Common report has it that the water passes underground to the Adige, coming to the light in some springs at the foot of the slope in that direction. The existence of such a connection is possible, in spite of the westerly dip of the strata, as the latter are much disturbed to the east of the lake. Were the water to rise until it overflowed the rim of the basin, it would take a course towards the Sarca. The formation of this and the other basin mentioned, by glacier action, is out of the question. It is rather due to the mountain structure itself, this region being traversed by an important line of fault. An example of a lake in undoubted connection with glacial phenomena, is that of Ledro, dammed back in an elevated valley west of the Lake of Garda, into which its outlet pours by a fine fall. The lake has an irregular outline, and its shores fall steeply down to extensive level bottom. Its former greater extent is shown by the remains of terraces higher up the valley, and by the depth to which the effluent has cut down into the barrier.

The direction taken by the ice to which this result is due, is, however, a disputed question, some holding that it was a branch of the Chiese glacier, which came over the pass of Monte Giovo down the Ledro valley to join the Adige glacier; others, that a part of the latter took a westerly course to join that of the Chiese. Damian thinks the latter more probable, owing to the greater importance of the Adige glacier, which seems to have filled the valley to a higher level than the other. The Ledro valley is, besides, more accessible from the east in spite of the narrow ravine at its mouth, the pass of Monte Giovo at its upper or western end being over 4000 feet above the sea. The arrangement of the materials in the dam also favours this view, the layers sloping more or less towards the lake.

The lake-basin of Andalo is held to be an example of one hollowed out, at least in its present form, by glacier ice.

In a recent number of the *Zeitschrift* of the Berlin Geographical Society Dr. Fritz Frech gives a very full study of the south-western Carnic Alps and the valleys of the Gail, Drave, and Fella-Save from the historical or geological point of view. Starting with the elevation of the Triassic rocks between Permian and Jurassic times, the lines of the most important valleys are shown to have been determined, subject of course to the limitations imposed by gravity, chiefly by the main lines of faulting, and their erosion to have taken place under climatic conditions markedly similar to those of the present day. The transporting action of glaciers is evidenced in the general removal of *débris* formed by weathering during that period from the central districts and its deposition at the outskirts of the mountains. The area surveyed derives, however, more general interest from the examples it presents of what the author regards as the direct erosive action of ice in forming "glacier-pots" (Karen) and inland lakes. The former are most frequently met with in the transverse-valleys of the Upper Lessach, usually at the higher end, cut out of the slate, although the most typical specimen, the Rosskar, is in quartzite. Such fresh data regarding these formations are specially valuable in view of Blümcke and Finsterwalder's researches on the chemical erosive action set up by changes of pressure under ice. Dr. Frech classifies the numerous lake-basins in the surveyed area into rock-basins, lakes formed by hollows on the surface of moraines, and those in which the glacial deposit merely acts as a dam. In all the larger rock-basins—the Wolayer, Strucken, Kartitsch, and Obstoanser lakes—the rotational or digging action is due to a peculiarity of formation—either faulting, or a change in the nature of the rock, and it seems probable that in some cases pre-glacial erosion accentuated these peculiarities, increasing the subsequent glacier action. Smaller lakes occurring on ridges and plateaux must be ascribed entirely to the ordinary movements of the ice, the constraint necessary for rotational action being absent. The lake-basins forming through damming, chiefly by terminal moraines near the close of the glacial period, are now mostly filled up, and the deposits cut into by streams—indicating a considerable lapse of time since their formation. Two somewhat peculiar cases may be noticed, in which the dam is at the upper instead of the lower end of the lake. The Presseker Lake, near Hermagor, and another near Draschitz, have been formed by the moraine deposit from another valley blocking a stream and forcing it to seek a new outlet, which has been found at a level lower than the top of the moraine. The latter part of the paper treats in detail of the action of post-glacial agencies in modifying the contours of the country, and includes a description of the effects of the great landslip on the southern slopes of the Dobratsch in 1348.

On the northern slopes of the Alps the lakes of the Salzkammergut have been mapped under the direction of Dr. A. Penck and Dr. J. Müllner of the Geographical

Institute of Vienna University, and a recently published work on 'The Lakes of the Traun Region' summarises the results.

The soundings made in 1806 in the Bavarian lakes, and in 1812 in the Traun lakes, could not overthrow the current belief in the unfathomable depths of most Alpine lakes. They were too isolated, and not being followed up were soon forgotten. Since 1845 Friedrich Simony undertook the careful exploration of the depths and temperatures of all the lakes of the Salzkammergut. He continued his explorations for forty years, and thus became the founder of the special branch of science termed by Forel, *Limnology*, or the scientific study of lakes. His figures relative to the depths of the Salzkammergut lakes are always referred to in scientific literature as thoroughly trustworthy.

Dr. Müllner has now utilised the mass of numerical data collected by F. Simony for the construction of maps of those lakes. All these maps are drawn on a uniform scale of 1 : 25,000, and show contour lines at every 10 metres (33 feet) of elevation above the sea—like the maps of lakes in the topographical atlas of Switzerland. The whole has been done with the accuracy required by this sort of work. The configuration of the bed of these lakes, which is all-important in speculating as to their origin, thus appears with the greatest clearness. Profiles are also given on the same scale. Several of the higher Alpine lakes have been explored by Dr. Müllner, and altogether thirty-five of the lakes of the Traun region are mapped. Five of them lie at altitudes of from 1312 to 1640 feet; twenty-one have altitudes of from 1640 to 3280 feet; four from 3280 to 4920 feet; and six are situated above the level of 4900 feet. The following figures relative to some of the best known lakes, are extracted from the general table in which all the sheets of water so far surveyed are recorded :—

	Height of Surface above Sea-level in Feet.	Area in Square Miles.	Greatest Depth in Fathoms.	Average Depth in Fathoms.
Traunsee	1384	8·75	104	49
Attersee	1525	17·75	93	46
Mondsee	1571	5·40	37	20
Hallstätter See	1620	3·25	68	36
Wolfgang See	1768	5·00	62	25
Furschlsee	2168	1·00	37	20
Vorderer Lahngang See	5010	0·07	42	18

THE MONTHLY RECORD.

THE SOCIETY.

The Session After Easter.—The first ordinary meeting of the Society after Easter will be held on April 24th, when the Hon. George Curzon, M.P., will read a paper on some of the geographical results of his recent visit to French Indo-China. On May 8th, Mr. W. M. Conway will give an account of his expedition to the Karakoram Mountains. It is hoped that the paper following that will be by Lieutenant Peary of the U.S. Navy, describing the results of his recent expedition to North Greenland,

and the plan of his proposed expedition for the exploration of the North Greenland coast.

The Oxford Geographical Studentship.—The Electors appointed by the Royal Geographical Society and the University of Oxford have elected to the annual Geographical Studentship, instituted jointly by the two bodies, Mr. W. H. Cozens-Hardy, B.A., of New College, who has, under the direction of the Council, taken the eastern frontiers of Montenegro as his field of research. Mr. Cozens-Hardy has the advantage of having had already some experience of travel in the region in question, and of a knowledge of the language spoken; he may be expected to collect much interesting information concerning a district which is still very imperfectly represented in maps, and has never been thoroughly investigated.

The Society's Educational Lectures.—The last of the series of ten educational lectures by Mr. H. J. Mackinder was given on March 24th. The success of this first series has been so satisfactory that the Council will probably be encouraged to continue the lectures in future years. Mr. Mackinder's course, of which the first series has just been concluded, is intended to cover three successive years. The arrangements for next year will be duly announced.

The Annual Dinner.—The annual dinner of the Society will be held on Saturday, May 13th, at the Whitehall Rooms of the Metropole Hotel. It was impossible to obtain the rooms for the evening of the anniversary meeting, May 29th. Full particulars will be found in the usual Society 'Notices.'

EUROPE.

Survey of Greece by Austrian Officers.—The survey of Greece which was begun in 1889 by the officers of the Imperial Military Geographical Institute, under the management of Lieut.-Col. H. Hartl, is already so advanced that the triangulation-net has been extended over the whole Kingdom. This year, a detailed topographical survey of Thessaly, which was begun in 1891, will be continued. At the same time, the Academy of Sciences sends out the geologist Hilber and the botanist Eugen von Hallaci for the exploration of the yet unknown highlands of North-West Thessaly. The botanical exploration of this province is the more desirable, as what is already known of the flora of Thessaly shows that it differs greatly from the general flora of the Balkan Peninsula. A young botanist will also be sent to Albania, in order to study the distribution of the Alpine flora. Interesting results are expected from these researches as well, the vegetation of the Balkan Peninsula generally offering a very original character.

AFRICA.

Memorial of Dr. Livingstone in Africa.—In January, 1889, the Council of the Royal Geographical Society voted a sum of money as a reward to the chief Chitambo, in whose territory Dr. Livingstone died, as a recognition of his ready permission for the removal of the great traveller's body. The money, intrusted to the Rev. F. S. Arnot, of the Garenganze mission, who hoped to be able to convey the present to the chief, was employed in the purchase of presents consisting of cloth and other articles, including a double-barrelled gun and equipments, the importation of firearms not being forbidden at that time. The cloth purchased consisted of three hundred and eighty-six handkerchiefs, eight pieces double-width blue cotton, five pieces cretonne, four pieces velvet, and five pieces silk, the whole costing in London £29. On arrival at Lake Bangweolo it was estimated that its value exceeded £100, the augmentation being due mainly to the extreme uncertainty of transport so far from the coast. Mr. Arnot was also the bearer of a memorial tablet in bronze which was sent by Mr. and Mrs. A. L. Bruce of Edinburgh (the son-in-law and daughter of Dr. Livingstone), with the intention of fastening it upon the tree at Chitambo's under which the explorer's heart was buried. Two copies of this tablet were sent out, in order to reduce the risk of loss. Mr. Arnot brought the presents and the tablet to Bihé in Portuguese West Africa. After considerable delay and overcoming many difficulties, the missionaries advanced to Nanakundunda, about half-way between Bihé and Lake Bangweolo, whence Mr. Arnot's colleague, Mr. H. B. Thompson, marched to the Garenganze country with the presents and memorial. But he, finding that it would be impossible to reach the place, delivered over his charge to Captain Bia, of the Katanga Company's expedition, who very kindly agreed to alter his route, in order to give the presents to the chief who succeeded Chitambo, and to fasten the bronze plate upon Livingstone's tree. This was at last accomplished by Lieutenant Franqui, one of the officers of the expedition, and it is a matter for congratulation that after twenty years the spot in central Africa most hallowed by associations of the greatest of modern African travellers should be worthily commemorated. The inscription on the bronze plate is simply—

LIVINGSTONE
DIED HERE,
ILALA, MAY 1st, 1873.

Mr. Theodore Bent's Expedition to Aksum.—Mr. Bent writes as

follows to the Secretary, under date, Adowa, February 19th, 1893:—"Probably you would see the difficulties that confronted us on landing at Massowa—namely, the war between Ras Alula and Ras Mangascia, which rendered it absolutely impossible for us to enter Tigrè. In fact at that time it looked almost hopeless, and we nearly decided to go off to Suakim, but the Governor encouraged us to wait a few weeks; so to pass the time we made excursions in the Italian colony to Keren in Bogos, and to some of the approachable Abyssinian convents, which time was really very well employed, though not producing any satisfactory archæological results. At last we got notice that Ras Alula had been beaten, and that Ras Mangascia would send an escort to meet us at the Mareb; so we came on as quick as we could with a huge caravan of people who had not been able to get before, and reached Adowa just a week ago. I have sent on a handsome present to Ras Mangascia to Makalle, where he at present is, and asking permission to do what I like at Adowa, which I hope may be granted. Meanwhile I have been examining the neighbourhood of Adowa from an archæological point of view, and I think our first efforts have been very successful. Up in the mountains, about 12 miles from here, we have discovered an ancient Himyaritic temple, identified this time by no less than seven inscriptions. This is very satisfactory to begin upon, and I hope to visit one or two more sites near here before going to Aksum. If all goes smoothly, which, by the way, is doubtful, and we know not which day we may not have to pack up and be off, we hope to spend several weeks in Aksum, and the smoother things go the longer we shall stay, perhaps not reaching England before the beginning of June."

The Course of the Lukuga. — The surviving members of the expeditions under M. Delcommune and Lieutenant Bia, which were recently engaged in explorations in the South-Eastern Congo Basin (see *Geographical Journal* for last month), are reported to have arrived at Leopoldville on February 5th. Captain Bia died at Bunkeya, but one of his officers, Lieutenant Franqui, succeeded in reaching Dr. Livingstone's grave. M. Delcommune left Mrumbi on the Tanganyika on October 15th, traced the Lukuga to Lake Lanji, and travelled thence to the port of Lusambo on the Upper Sankuru, whence the *Roi des Belges* conveyed him down the Congo. The only representative of the Congo State still remaining in the old kingdom of Msidi appears to be Lieutenant Legat, who occupies the fort built by Captain Stairs at Bunkeya. After M. Delcommune's very successful journey, the fact of the Lukuga being an outlet of Lake Tanganyika is no longer open to the slightest doubt. Commander Cameron, who discovered that river in 1879, and followed it for about 4 miles, found it blocked by vegetation, but observed a decided current setting out of

the lake, and was told by the natives that it reached the Lualaba.* Mr. Stanley, in the following year, travelled about 5 miles beyond Commander Cameron's furthest, and found that a sand-bar cut off all connection between the lake and the basin of the Lualaba, but predicted that a small rise of the lake would suffice to sweep away this barrier.† The rains during 1877–8 were exceptionally heavy, the lake rose rapidly, and Mr. Stanley's prediction was fulfilled. Mr. E. C. Hore in 1878 found the Lukuga to flow out of the lake,‡ whilst Mr. Joseph Thomson, in 1879, describes it as "unusually free of all vegetable obstructions," and as "sweeping along between clearly-cut banks and in a deep channel."§ When Major von Wissmann visited the Lukuga in 1882 it still flowed out of the lake, and so it did during his second visit in 1886, although the level of the lake had fallen four feet in the interval.‖ As the fluctuations in the level of the lake exceed 16 feet, a time must come when the Lukuga shall no longer be an outlet, unless indeed Major von Wissmann's suggestion, that the level of the lake be regulated by building a lock across its debouchure, be acted upon.

The Northern Interior of the Cameroons.—Notes on a journey made by Lieutenant von Stettin to the recently-founded station of Baliburg, about 180 miles north-north-east of the Cameroons estuary, appear in the *Deutsches Kolonialblatt* for January 15th last. From the station of Mundame, on the Upper Mungo, the caravan track leads through (1) the forest-land; (2) the Banyang country; and (3) that of the Balis, in which the station is situated. The inhabitants of the first zone are peaceful and industrious, and seem inclined to trade. They retire, however, before the overbearing Bali traders who pass through their district. The Banyangs are more respected by the latter; but their want of union prevents their forming the barrier that could be wished against the encroachments of the Balis, who, having been armed, may become a source of danger to the colony. These last show an extraordinary eagerness for European goods, and are the most active traders of the country, even acting as middlemen between the other tribes and the coast. They seem untrustworthy as porters, but might be useful for temporary service as troops. Many of the clearings in the forest belt have been abandoned, but not for want of a fertile soil; the Banyang country, on the contrary, is a perfect garden. Indiarubber and elephants abound; poultry, sheep, and goats are plentiful, and fine

* 'Across Africa,' p. 226.
† 'Through the Dark Continent,' ii., p. 52.
‡ 'Tanganyika,' pp. 113, 147.
§ 'To the African Lakes and Back,' ii., pp. 58, 66.
‖ 'Unter Deutscher Flagge,' p. 224, and 'My Second Journey through Equatorial Africa,' p. 255.

cattle are seen in parts of the forest zone. Several firms have opened factories on the road. Calabar, however, diverts a part of the trade; and, in Von Stettin's opinion, the nearness of the Benue will stand in the way of the expansion of German trade in the northern parts.

The Change in Level of the African Lakes.—Dr. R. Sieger, of Vienna, has recently critically examined (*Globus*, vol. 62, No. 21) the various statements of African explorers concerning the different levels of many African lakes. His careful collation of African literature of the last forty years has led him to the conclusion that at present the levels of the principal lakes in that continent are falling. He attributes this principally to climatological changes, and assumes that the levels of the lakes sink and rise in certain recurring periods. In some cases this is no doubt correct, but on the whole the areas of the lakes are becoming less; a fact which is probably due not only to climatological, but also to geological influences, partly local, and partly general.

NORTH AMERICA.

Irrigation Value of Snow in North-West America.—Professor Ratzel has a note in the January number of *Peterman's Mitteilungen* on the importance of snow as natural reservoirs for irrigation purposes on the elevated and poorly-watered tableland of western North America. In all this region winter is the wet season. The absence of summer rains after June and July is one of the chief conditions of the existence of the "fertile belt" of corn-growing country which stretches up to Manitoba. This contrast is markedly illustrated by the results of observations in eastern Oregon and Idaho, which are characteristic for the northern part of the region referred to. There we find that 66·6 per cent. of the moisture falls in the winter months (November to March), while the summer months (July to September) have only 5·9 per cent. Montana exhibits a somewhat different type, as in this state we find the earlier summer with the greatest proportion of moisture (over 33 per cent.). Further south December to March are the months of greatest moisture; on the eastern slopes of the Sierra Nevada an increase in altitude of 500 or 600 feet often means double or triple the amount of moisture. In the combination of these two facts—the increase of moisture with altitude, and the prevalence of winter rains or snow, lie the conditions which alone can make the region referred to habitable and capable of successful cultivation, and the great importance of the slowly-melting snow of the uplands is therefore apparent. In the case of Nevada the rivers bring down 75 per cent of their average annual water supply in April, May, and June, while nearly two-thirds of the annual moisture fall in the winter months. The rivers of Wyoming, Montana, and Oregon exhibit similar conditions. As a rule it will be seen that the rivers are fullest three months after the period of the maximum precipitation. True, the low temperature of the snow-water may sometimes injure the young plants, but not appreciably more than does the saline matter absorbed by the rain in its passage through the soil of the Steppe. Rivers which have their sources at considerable altitudes are therefore of great value to the irrigator, as the snow from which they derive their supply melts more slowly. Here Wyoming has the advantage of Oregon. An early summer is bad, as the snow melts quickly. A late snowfall is not much better, as the snow has no time to get

hard, and so disappears rapidly when summer sets in. The most favourable conditions are a heavy snowfall in the early winter, as this supplies a reservoir that absorbs and preserves any moisture that may fall later on. Frost too plays an important part; it appears that if the snow falls on soft, unfrozen ground its moisture is absorbed and preserved for future use, while if the ground is frozen, a much greater quantity of the snow is melted by the sun and finds its way into the rivers at a time of year when it is not wanted. A report from Northern Oregon ascribes the good harvest of 1885, and the failure of the crops in 1888 to this fact. Deforestation, here as in other parts of the world, is a danger to the farmer, the woods tending to keep the snow together longer, and to protect it from the sun's rays.

AUSTRALASIA.

Ancient Glaciers of New Zealand.—In the second number of the *New Zealand Alpine Journal*, Capt. F. W. Hutton, F.R.S., publishes a short paper on the ancient glaciers of New Zealand, illustrated by a map. His conclusions are that at the time of their greatest extension the ancient glaciers of New Zealand were larger and descended lower the further they were south. The terminal moraines in North-west Nelson go to 2700 feet above the present sea-level; Lake Rotoiti, in South Nelson, to 2000 feet; Lake Sumner, probably (Capt. Hutton believes) a glacier lake, is 1700 feet above the sea. In South Canterbury the terminal moraines are 1000 feet, and in South Otago only 600 feet above the present sea-level. In Westland, and in the West Coast sounds, the glaciers advanced to below the present sea-level. The glacier of Boulder River was 4 miles, and that of Lake Rotoiti about 12 miles in length; the glacier at the head of the Waiau-ua, or Dillon, 14 miles; that of the Rakaia, 55 miles; the Wanaka Glacier, 60; that of Wakatipu, 80; and that of Te Anau, 65 miles in length. There is, therefore, a considerable difference in relative proportion between the ancient glaciers and their present representatives, as a glance at the map accompanying this paper will show. At present they reach their maximum in South Canterbury, and get smaller both to the north and to the south; while in ancient times their maximum was in Central Otago. This difference may, perhaps, be due to the Otago Mountains having then been relatively higher than they are at present. Or it may have been due to the great breadth of mountains, at present from 4000 to 7000 feet in height, in Central Otago which were probably covered with snow during the great glacier period.

German New Guinea.—Herr G. Schmiele, who has resided for five years in the German Australasian possessions, gives in *Nachrichten über Kaiser Wilhelms-Land und den Bismarck-Archipel*, an interesting report on the characteristics and capabilities of the new colonies in that region. New Guinea, from the scale of its natural features possesses quite a continental character, compared with the smaller islands of Java, Sumatra, and Ceylon. If recent reports be true, its culminating point is 15,000 feet high and covered with perpetual snow, while the outer ranges, where they do not fall steeply into the sea, are bordered by well-watered plains of rich deep alluvium. The most eligible of these, that of Astrolabe Bay, was chosen

as the field on which to concentrate the first efforts towards the development of the country. Herr Schmiele is very sanguine as to the prospects of the young colony. From a comparison with the three islands above mentioned, he finds that German New Guinea has the advantage in all the most important respects. Instead of the open roadsteads, swampy river mouths, or costly works, by which access is had to their coasts, it boasts of such excellent natural harbours as Friedrich Wilhelm Hafen, Alexis Hafen, and the like, while for fertility the older colonies with their more or ess exhausted soil, are, with the exception of certain parts of Java, not to be compared with it. Although malarious in its present stage of development, it is, according to Herr Schmiele, no more so, perhaps less, than other tropical colonies have been, while besides fever, no other disease prevails. The distance from Europe is compensated for by the paying nature of its products. A more serious hindrance is the want of labour, for the natives are few and not disposed to work, while the mortality among those brought from the Bismarck Archipelago, and the expense incurred on them, prohibit their employment. In the islands of that Archipelago different conditions prevail. Their thinner coating of humus, their insular climate, and more moderate but more evenly distributed rainfall, their low elevation and exposure throughout to the sea breezes which allows the cocoa-nut palm to grow everywhere, mark them out at once as a field for the production of *copra* and cotton. Being well peopled by a race which is industrious and hardy, the labour question presents no difficulty. Herr Schmiele can say less about the Solomon Islands, though the well-watered heights of Bougainville give the appearance of being adapted for coffee cultivation. The treachery of the natives will render caution necessary in beginning operations here.

POLAR REGIONS.

Mr. F. G. Jackson's Proposed Polar Expedition.—In reply to a request to furnish information to the *Geographical Journal* on his proposed expedition to Franz Josef Land and Polewards, Mr. F. G. Jackson writes as follows:—"Readers of the *Proceedings* of the Royal Geographical Society will not need to be reminded of the great favour which has been shown to the Franz Josef Land route for future Polar exploration ever since the Leigh Smith expeditions of 1880 and 1881. The Franz Josef Land route is held to be, I maintain, the best of the routes open to the Arctic explorer. The objects I have in view in my projected journey may be conveniently summarised under two heads: 1. The general exploration of Franz Josef Land, and, in particular, the discovery and mapping of its northern regions; the observation of the climatic conditions encountered; the recording of such geological evidence as is met with; and the general investigation of the geographical conditions of the country. 2. An advance in a northerly direction which shall be so far continued as to bring me within the immediate locality of the North Pole, and an endeavour, by all means in my power, to observe the geographical conditions at that mathematical point. Speaking generally, my plan may be described as an advance northward on land as far as such land continues; an advance which shall be made more secure and more open to retreat by the establishment of a series of depots, reaching at intervals of

about 100 miles from about the parallel of 80° to the most northern point of the land, or the locality of the North Pole, whichever shall be met with first. I propose to utilise, in my northward march, a number of strong light sledges, and to employ dogs to drag them when feasible. I further propose to take boats on my land journey, but these boats will be of a special character, and very portable. I shall also have at least three whale boats. These, however, will be left at the original depot, established at or near our first landing-place. I shall take not more than ten men. It will be my endeavour to land either at Cape Flora or in Eira Harbour, or perhaps on one of the islands eastwards. This must depend to a great extent on the local conditions of ice this year. After we have been landed and have raised our first depot, we shall have for at least one year no further use for the ship which has taken us out. It might, however, be practicable to make a rapid reconnoitre northward, and return with some interesting results before the ship should be obliged to make south again. It is quite possible that we may find, in the summer of 1894, that our advance towards the immediate region of the Pole is either feasible or impracticable. Under the most favourable conditions—which I would assume to be the stretching of Franz Josef Land into the immediate regions of the Pole—we might achieve our objects and return to the southern shores of Franz Josef Land in the late summer of 1894. At any rate, by the summer of 1895, I think we should have proved whether the Pole is practicable or not by the Franz Josef Land route, and be in a position to return to Europe. Thus we require two years in which to attain all our objects or prove the impracticability of attaining one of them. In any case I shall endeavour, with all my power, to bring back a faithful report of the geographical conditions in a region of the Earth more northerly than any that has yet been observed or, indeed, reached."

Lieutenant Peary's Proposed Arctic Exploration.—Lieut. Peary, according to an authorised communication in an American newspaper, will start for the North about midsummer with the intention of spending two years in Arctic exploration. His party will not number more than ten, as Mr. Peary believes that the largeness of an expedition is an additional source of weakness, and that with a small party of picked men he is most likely to succeed in his undertaking. He intends to charter one of the St. John's whalers to transport his party, and he will form his winter camp on the north coast of Inglefield Gulf, a little to the east of last year's camp. The advantage of this change is the greater ease with which the party will be able to reach the great inland ice cap, and the saving of two weeks' hard work. The explorer hopes to reach his camp in the last week of July, and as soon as the ice is in condition for sledging he will set a party to work on a detailed survey of Inglefield Gulf, which is worthy of close investigation, as it is the deepest indentation on the coast, and its shore is diversified by many mountains. A party will also be sent out on the inland ice to carry supplies as far to the north-east as they can, where they will establish a *cache*, and so greatly facilitate Peary's movements at the commencement of next spring. Last year it was not until May 15th that a start was made with the sledges; but next year the explorer

hopes to begin early in March, and he intends to try the novel experiment of using donkeys or ponies to supplement his dog teams. Peary had conceived this idea before he heard of Glave's successful attempt to fit snow-shoes on horses. The expedition proceeding from the main camp to the north-east of Greenland will not exceed half-a-dozen men; on reaching Independence Bay three of the number will likely be detailed to survey the coast. The route to North Greenland will probably be a mean between Peary's outward and return routes last spring. A more southern outward track would, he hopes, avoid the great crevasses which so greatly obstructed his progress. On his more southern return journey when sledging along the ice-cap he was often at an elevation of 8000 feet, and travelling in fog and mist. By keeping more to the north than this he hopes to escape both the crevasses and the fogs. The purpose of the expedition is to determine the coast-line from Independence Bay to Cape Bismarck, for which work a party of three will be appointed; and to explore the Archipelago lying north of the mainland. It is possible that during the winter of 1894–95 Peary will camp further north than explorers have ever yet done. He will probably work round the eastern shore of the Archipelago until he comes to the point on the western coast reached by Greely. Peary has no theory as to the extension of this Archipelago towards the Pole; he hopes to map out the land and determine how far northwards it extends, reserving his final plans until the special circumstances of the case show him what is the best course to adopt. It is possible we may not hear news of the explorer until the summer of 1895, when a vessel will be sent to take his party home, but he may utilise the Eskimos as mail-carriers, and send home a package of letters in 1894, the experiment tried in this way during his last expedition having been successful. The expedition has been planned carefully in the light of earlier experience, and it is probable that good Arctic work may be done, and observations of value collected.

The Antarctic Whalers.—The arrival of the Dundee whaling fleet at the Falkland Islands in the beginning of December was mentioned in our February number, p. 172. From news recently received we learn that the vessels made a much shorter stay in the Antarctic ice than was anticipated. They returned safely to the Falkland Islands in the middle of February, and are now on the way home. The code telegram mentioning their arrival was unfortunately mutilated in transmission, and it does not appear whether the expedition was commercially successful or not. The scientific results cannot be very great, on account of the short stay in southern waters; and it is improbable that a high latitude was reached.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

The Total Area of Land on the Globe.—A. Oppel, of Bremen, has recently remarked in *Ausland* that the statistics on this subject vary considerably. For instance, in 1872 the area of land on the globe was carefully calculated to be 133,770,000 square kilometres (50,830,000 square miles), whilst in 1891 it was found to be 135,490,765 square kilometres. This difference of 1,720,765 square kilometres (654,000 square miles, about three times the area of the German Empire) how-

ever, according to Oppel, is due less to the changes of the coast-lines during this period of time than to fresh discoveries of land in the Arctic regions, *e.g.* Franz-Josef Land, Lincoln-Grant Land, and the most northern parts of Greenland; and to the more exact methods for ascertaining the areas of subdivisions of continents. B. Trognitz and General J. Strelbitsky have done good work in the latter respect, in ascertaining by planimetric computations the areas of Europe, Asia, Africa, and Central and South America. But many points are still uncertain, and Oppel is of opinion that several decades must elapse before we can arrive at any approach to a definite conclusion about the exact area of the land surface of the globe. The main source of uncertainty rests, of course, in the area assumed for the Antarctic continent, which is apparently left out of account in the estimates given above.

Distribution of Soil on Earth's Surface.—Dr. Alexis von Tillo has been investigating the distribution of various kinds of soil over the Earth's surface, with a view to ascertaining the area occupied by each. He bases his calculations on Sheet 4 of Berghaus' Physical Atlas. This map and Dr. Tillo's calculations deal with the six great classes of soil into which Baron von Richthofen divides the covering of the land-surface of the globe ('Führer für Forschungsreisende,' p. 498). In the classification of the submarine deposits, Murray and Renard's map is followed. The following figures, being a portion of two out of the six tables drawn up by Dr. von Tillo, will suffice to summarise the results of his investigations:—

1. Land Surface Deposits (Percentage).

——	Europe.	Asia.	Africa.	North America.	South America.	Oceania.	Total.
Alluvial Regions	22	54	50	26	45	31	43
Regions in which denudation and sedimentation are equal	8	3	3	4	9	..	4
Denudation preponderating .	9	7	14	27	1	2	11
Sedimentation preponderating	54	33	33	38	35	62	38
Acolian deposits eroded; Loess	7	3	..	5	10	..	4
Coral islands	..	..	..	..	..	5	0

2. Submarine Deposits (Percentage).

——	Pacific Ocean.	Indian Ocean.	Atlantic.	Total.
Continental deposits	12	15	23	22
Organic deposits	29	65	62	42
Inorganic deposits (red clay) . .	55	18	13	33
Coral sand	4	2	2	3

It appears from Dr. von Tillo's calculations that one-quarter of the land-

surface of the globe is covered by laterite, which is the type of soil most common in the tropics. It occupies 49 and 43 per cent. respectively of the area of Africa and South America, these continents having a greater extent in tropical regions than any other. Clay, though only forming 18 per cent. of the total land-surface, claims 37 per cent. of Asia (Siberia, Central China). As regards the submarine deposits, the Atlantic Ocean has the largest percentage of continental deposits—a fact which strikingly illustrates the extent of the Atlantic drainage area. The Atlantic and the Indian Oceans show a preponderance of organic deposits, while the bottom of the Pacific is covered to an extent of over half its surface by red clay. A comparison of the northern and southern hemispheres reveals a curious equality in the distribution of the various types. Preponderating sedimentation occupies 38 per cent., or 4 per cent. of the area of each hemisphere. We find denudation and sedimentation equal; loess, too, is about equally divided. It appears, however, that the area of alluvial formation is more extended in the Southern Hemisphere; while active denudation affects 14 per cent. of the Northern against only 2 per cent. of the Southern Hemisphere.

Movements of Underground Water.—In Bulletin No. 5 of the Weather Bureau, recently issued by the U.S. Department of Agriculture, Professor F. H. King discusses an interesting series of experiments on fluctuations in the level and the rate of movement of ground water, made at the experimental agricultural station at Whitewater, Wisconsin. The observations deal with fifty-six wells sunk in glacial clay near the margin of Lake Mendota, covering an area some 1200 feet by 1000 feet, at twelve of which the variations of level were continuously recorded by automatic instruments. Starting with a confirmation of the general rule, due to Mr. Baldwin Latham, that the flow of subterranean water conforms to the surface of the country, the observations disclose periodic variations of level of great complexity. It is shown that there is a marked tendency to semidiurnal oscillations, the water as a rule standing higher in the morning, or at least falling less rapidly during the night. Experiments show that these oscillations are caused by changes in the retentive power of the soil, produced at least in part by variations of temperature, although it has not been possible to prove the absence of the tidal effect suggested by Roberts in 1883, a point which receives fresh interest from the recent researches of Rebeur-Paschwitz at Teneriffe. The change of level produced by the passing of a heavy train in a well 140 feet distant from the railway track raises another similar question, which indicates the possibility of obtaining important results from a comparison of simultaneous records from a seismograph and the well instruments. Professor King finds a remarkably close agreement between the changes of rate of flow from drains and springs and those of barometric pressure.

Magnetical Survey and Gravity-Measurements.—The measurements of magnetic declination, inclination, and total intensity throughout Austria-Hungary, which must be completed next year, are being continued, and the magnetic survey of Bosnia and Herzegovina is about to be commenced. The same measurements will be continued by naval officers along the whole coast-line of Dalmatia, Albania, and Greece. At the same time measurements of the force of gravity at different heights will be carried out, and the variations due to the attraction of various strata of the Earth's crust studied. These measurements were undertaken in Austria by Lieut. R. von Sterneck, in 1882, and have already given most brilliant results; this year they will be continued in distant seas by an officer of the navy, Lieut. Gratzel, who has accompanied the Grand Duke Franz Ferdinand Este on his journey around the world, and now takes on board his ship a pendulum-apparatus for making pendulum observations at various spots of the Pacific Ocean.

The 'Pola' Deep-Sea Explorations.—The full results of the deep-sea explorations which were made during the last three summers in the Eastern Mediterranean basin on board the *Pola* have just been issued as a separate work. The Vienna Academy of Sciences has decided to continue the same explorations in the Aegæan and the Marmora Seas this summer. The configuration of the sea-bed, the temperature, the density and salinity of water at great and small depths, as well as the colour of water, its transparency, and its permeability for chemical rays, will be studied, as well as the organic life at various depths. The *Pola*, which is supplied with the very best instruments, and is well equipped for its special purpose, will be under the command of Captain W. Moerth. Hofrath F. Steindachner, Director of the Zoological Department of the Natural History Museum, will have the general management of scientific work; while J. Luksch, Professor of the Marine Academy, undertakes to make the physical observations; Dr. K. Natterer will carry on the chemical work; and Dr. E. von Marenzeller, who has just communicated to the Academy an elaborate 'Report upon New Deep-sea Echinoderms,' will make the biological explorations. The soundings will be carried on by naval officers.

EDUCATIONAL.

German School Tours.—In 'Child Life' for November last there is a description of one of the school tours which play an important part in the system of education in vogue in German schools, and primarily assist the study of geography, though at the same time helping history and other branches of study. The scheme of instruction followed by the school in question is arranged according to the principles of Herbart, as methodised by his follower Ziller. According to the German method of *Heimatskunde* the third school year (*i.e.*, for children of nine or ten

years of age) is devoted to the study of the immediate neighbourhood of the place in which they live. Instruction is first given at school as to the physical features, animals, and plants, legends, etc., of the district, and this is then impressed upon the minds of the pupils in an expedition intended to bring everything actually before their eyes. In order that the full benefit may be gained from it, the children are accustomed beforehand to receive instruction in the open air, and including recreation, to spend the greater part of the day out of doors. They set out with knapsacks on their backs, prepared for an absence from home of two nights, led by their teacher, who explains and questions on all that is seen. They pass through the towns they have heard of, and visit the cathedral or whatever else may be worth seeing, usually for the sake of health and economy, spending the night at some little country inn. They live very simply, and the tour costs surprisingly little. Each succeeding year a more extended one is made, and boys of sufficient means may even go as far as Venice and the Tyrol, still with knapsacks on their backs. This method of instruction is dealt with by Professor Rein and others in handbooks published at Dresden (Bleyl and Kammerer).

GENERAL.

The Work of the Russian Geographical Society.—The annual meeting of this Society was held on February 1st, 1893. A report on the work of the Society was read by the Secretary. It deplored the loss of the last survivor of the founders of the Society, P. A. Tchihatcheff. The new expeditions of the Society were then referred to, the report dwelling at some length upon those to Central Asia. One of them is already at work, M. Berezowski being in the province of Se-chuan; while the members of the other—M. Potanin and the geologist Obrucheff—have started from Peking. The report then goes on to mention that during the past year explorers were at work in Central Russia, collecting materials relative to the extremely original musical construction of Russian popular songs. They will now continue these in the governments of Yaroslav, Viatka, and Kostroma. M. Vilkitsky made, last year, determinations of the force of gravity and the magnetic elements in south-west Russia. The reserve capital of the Society amounts to 122,100 roubles. The Constantine medal was awarded this year to M. Karpinsky for his geological work; the Count Lütke medal was awarded to Professor Klossovsky for his extensive meteorological researches relative to the climatic conditions of south-west Russia; and two great gold medals were awarded, one to A. I. Sobolevsky for ethnographical work, and the other to N. Borodin for his book on the Ural Cossacks. Four small gold, and several silver, medals were distributed for works of less importance.

Hinná: An Ancient Remedy for Scurvy.—Major Raverty sends the following interesting note on this subject: "In my researches into the geography and history of Central Asian countries I met, some time ago, with accounts of the havoc worked by scurvy among the defenders of some of the strong fortresses of Ghur and Gharjzistán, east and north-east of Hirat, and other parts, and the accidental discovery of a remedy for it. After reading Dr. Nansen's interesting paper in the January number of the *Geographical Journal*, it occurred to me that it might be of interest (and possibly of use) to him and to other explorers to hear of a remedy used with great efficacy just six hundred and sixty-six years ago. The most notable case was during the siege of the fortified town of Uk, of Sijis-stán, by the Mughals in 1227 A.D., which held out for nineteen months. The people of the place were afflicted with the pestilence, the presence of which was indicated by their mouths aching and swelling; then their teeth became loose, and the third day after being attacked death would ensue. It so happened that one day a woman in the place was attacked with this aching of the mouth, and next day all her teeth became loose. She had a little daughter, and, giving up all hope of life, on the third night (the night precedes the day in the East) she said to her child: 'My dear, to-night I will anoint thy hands and feet with *hinná*, for to-morrow is the third day, and the time of thy mother's decease is near.' Now it is usual with women, when applying *hinná* to the hands and feet of anyone, first to moisten their fingers with their saliva, and then they apply the *hinná* to the part to be dyed. Having applied the *hinná* to the child's hands and feet, the author who relates these facts says, 'The woman then resigned her heart to death, and went to sleep.' In the morning she awoke, and found that her teeth during the night 'had become firmly fixed at the roots, and the aching of the mouth had entirely passed away.' When the third day came and passed, the neighbours came in expectation of finding her dead; instead of which they found her recovered, and on the fourth day she had become quite well again. The author says the people were astonished, and after hearing the woman's account, agreed together that *hinná* was the cure for this disease; and afterwards, whenever people were attacked by it, they used to put a bit of *hinná* in their mouths, and they used to recover. After that a *mann* (from two pounds to six pounds, according to locality) of *hinná* reached the price of two hundred and fifty gold *dináṛs* (sequins —about £145), and it was afterwards extensively used."

Dallmeyer's Telephotographic Lens.—This lens, to the production of which Mr. Dallmeyer first turned his attention in the autumn of 1891, is likely to prove of great value to explorers. The object in view was to construct a lens capable of producing large primary images of sufficient brilliancy to be of practical value in rapid photography.

Hitherto, in the production of large images, it has been accomplished by the use of very long focus positive lenses, or by the production of a primary image by one positive lens, and placing a secondary magnifier, or second positive lens, behind the plane of the primary image, to enlarge it according to its focal length. The first of these methods is principally employed in astronomy, and would be quite unsuitable for an explorer; while the second method referred to is practically useless for ordinary photographic work, on account of the great loss of light involved. The telephotographic lens is composed of two elements, and the image given by it is primary and inverted. In principle it is identical with Dollond's adaptation of Barlow's lens for increasing the focal length, and, accordingly, the magnitude of the image, without materially lengthening telescope tubes; but there are differences in detail. The results obtained by the use of this lens, judging from the specimens which have been exhibited, are highly satisfactory. Its magnifying power is so great that it gives minute details, in objects photographed, which are quite invisible when taken from the same spot with an ordinary camera. As might be supposed, it is not so rapid as the ordinary lens employed in photography; but with favourable atmospheric circumstances it is sufficiently rapid for all practical purposes. To maintain the necessary rapidity, and amount of angle included, the form of construction recommended gives a magnification of four times linear, as compared to an ordinary lens requiring the same extension of camera. The form of construction of the lens, however, is such that an image can be formed at any extension of the camera. The less the extension the less the magnification, but the greater rapidity, and *vice versâ*. The positive element of the telephotographic lens consists of the well-known portrait lens of the late J. H. Dallmeyer; and the complete lens only requires a special negative attachment that can be adapted to either old or new lenses of that type. A pamphlet has been published by the inventor giving full particulars of the manner in which this lens can be used to the best advantage.

CORRESPONDENCE.

The Nomenclature of the Karakoram Peaks.

March 16th, 1893.

Sir,—I have been unable to reply to Mr. Conway's communication in the February number on "The Nomenclature of Himalayan Peaks" owing to other work. I still consider there is no evidence worthy of acceptance to connect either Chiring or Skinmang with any peak in their vicinity. I am well aware it is frequently the case that the name of the higher pastures, or a stream flowing through them, will give the name to some culminating point rising at their head. Such names are generally well-known to the shepherds or the native *shikaris* who hunt there,

but I cannot remember an instance where such names lying in one line of drainage have been applied to peaks at the head of another main valley many miles away.

All the halting-places on the "Punmah" or "Pulmah Glacier" are well-known to those Baltis who, being connected in trade with Yarkand, cross the main range here. No place is better known than Skinmang, and I cannot conceive, firstly, by what line of reasoning that name can be applied to a peak somewhere east of Captain Younghusband's Mustakh Pass, which must be somewhere at the head of a tributary glacier joining the great glacier he came up on the north; and, secondly, how Chiring can be transferred to K2, which is 20 miles away and not visible from that halting-place. If we knew another Chiring was situated on the Baltoro Glacier, or on the road to Yarkand on the north side of the Mustakh, I can well imagine its being applied to K2. When, however, the Baltis transfer the name of a pasture to a peak they add the affix "go," the Thibetan for the *head;* and Skinmang would become Skinmango; Chiring, Chiringo. Look at the engraved sheets of the country near Skardo for numerous instances of this nomenclature, and I have found the same to extend far east of Ladak to the neighbourhood of the Pangkong Lake. If Skinmang could be applied to the name of any peak it would naturally be to one I ascended from the place itself; from there I saw all the peaks on the high ridge to the south separating us from the Baltoro Glacier. Not a native with me, and they knew the ground well, and were the best guides that could then be procured, called any of them after Skinmang, even the one I was on had the name of Mide Go.

From the time I first saw K2, from the peaks on the border of the Deosai plains, and when working towards it in 1861 (and no personality was attached to it in those days), although constantly asking men of the country, I never succeeded in obtaining a name for it, or I should have at once put it down and verified it. My great object was to obtain names for the numerous peaks, only then known to the Survey by the letter K series (Karakoram) of observed angles, or the T. I. series (Trans-Indus), or B, those observed by Mr. G. W. Beverley. This assistant and Messrs. W. H. Johnson and G. Shelverton, who took part in the triangulation, would have recorded the name of any well-marked peak in preference to a letter on getting reliable information. Mr. R. Lydekker, when on the Baltoro and on the Punmah Glacier, informs me he constantly tried to get a name for K2, but without success. Mr. F. Drew had peculiarly good opportunities of getting a name if any existed, during the time he was in Baltistan. He had lived for years in Kashmir in the Maharaja's service, and spoke well, not only Hindustani, but Kashmiri and Panjabi. Can all this be overlooked, and on the meagre, unsupported evidence of one native this name "Chiring" be put forward as one worthy of acceptance? It was hardly worthy of serious record. A native will say anything, particularly when leading questions are put to him, and he thinks he will please his questioner, and be rewarded for his information; besides, this man's statements were not even supported by any evidence, ocular or otherwise. This, in my opinion, is a somewhat hasty, slipshod, unreliable method of obtaining and perpetuating geographical information, and with what object on such single testimony. I quite think a local name should be adopted in all cases, if one can be found in use among the natives, and there are many good instances in Baltistan, such as Masherbrum, etc., but it is utterly wrong to strain evidence, unsupported, to fit one in, nor can an appeal to rules or the writings of others assist in strengthening unreliable evidence.

I am sorry Mr. Conway has said my interest in the name of K2 is a personal one, as if my object in noticing the Geographical "Notes" in the December number was actuated by such a feeling; it is rather cutting the ground from under my feet, and certainly does not make anything I may write a pleasurable task. I should

myself have preferred, long ago, to see the peak called "Mount Waugh," after the Surveyor-General of India, during whose tenure of office it was first observed to, and following the precedent of naming the highest point of the Himalayas "Mount Everest" some years before. I am at the same time not in favour of surnames of persons being given to unnamed peaks, still less am I in favour of such English compounds as "The Watch Tower of India," "The White Lily," "The Pioneer Peak," which Mr. Conway delights in, because eventually according to the taste of the traveller we shall be presented with all sorts of fanciful, incongruous or vulgar titles, perhaps to the exclusion of the native names.

I am led also to write again on this subject, as I notice in *The Leisure Hour* for February Mr. Edward Whymper including "Chiring" among the names of K2, together with that of "Dapsang Peak" (the Schlagintweits having called it thus from the point they saw it from). Now these Dipsang plains (see Indian Survey Sheets) are no less than 95 miles from K2, and can hardly, by any stretch of imagination, be called a neighbouring plateau. Moreover, from that plateau, the summit of K2 can only be seen rising 50 miles beyond the high intervening range some 20,000 feet at the head of the Nubra River. I cannot agree with Mr. Whymper that this is an appropriate name, for if any high plateau is to give its name to K2, surely "The Deosai Peak" is the one we should select, for it is so much nearer, only 40 miles, and facing the peak itself, affording the most splendid view of it and the whole range of peaks in its vicinity. But why go in search of names when "The Mustakh Peak" would be the best and most accurate title of all?

The peak for which I obtained the name Mango Guzor is not named I consider after the pasture on the Biafo glacier, but from pastures under the peak itself, for being the highest they are called by those who use them "Mang Go." This term appears to be as common and similar in its indication as our farm names for fields, "Further-moor," "further-meadow," "further-worth," &c. The meaning of Guzor I do not know for certain, but it is not unlikely to be the name of the individual or family who went up under the peak in the summer months with the sheep, goats and half-bred yaks. The people of Baltistan, from long intercourse with the Dogra troops quartered in their country (and many of them serve in the Maharaja's army at Srinagar and Jammoo), have picked up a great number of Kashmiri and Panjabi words, in common use in the outer hills. I think it very possible that "Guzor" is only a corruption of "Gujur," the name of the class who in that part of the outer Himalayas wander about the high pastures in the summer months with their milch buffaloes and cows. Thus Mango Guzor would mean "the high or head pasture of the 'Gujurs'" by the people of Shigar who use it, and simply Mango by those of Askolay who do not go there.

H. H. Godwin-Austen, Lt.-Col.

The Editor of *The Geographical Journal.*

[Whether there is or is not a local name for K2 is a question that has long been discussed. A native told Mr. Eckenstein that there was one, and that it was Chiring. Mr. Eckenstein reported the statement to me, and I, as in duty bound, put the statement on record for what it was worth, pronouncing, however, no opinion upon it. In the *Journal* for February Colonel Godwin-Austen rallied me upon "placing reliance and importance on what a native drew on the sand," and implied that I was ignorant of what the names meant. He stated that they were not possible names for peaks. In reply I pointed out that they were possible names for peaks; and moreover, that there were other peaks having similar names. Now Colonel Godwin-Austen withdraws from his position, and, in doing so, writes a letter full of much

valuable information, for which I am more than thankful. He still thinks that Chiring is not the name of K2, and, truth to tell, I have always thought so too, but neither he nor I can be sure. The statement had to be recorded in order to guide the inquiries of future travellers.

I referred to Colonel Godwin-Austen's personal interest in the name of K2, not for the purpose of embarrassing him, but to clear myself from any possible blame in the matter of this already too prolonged correspondence. I desire to do all honour to my forerunners in the exploration of the Mustagh Range, and so desiring, it is with extreme regret that I find myself entangled in argument with one of them over a matter of this sort into which some people (though of course neither Col. Godwin-Austen nor myself) might consider that a personal element entered.

Colonel Godwin-Austen objects to the "Watch-Tower," "the White Lily," "the Pioneer Peak" (I have plenty more in store) as "fanciful, incongruous, or vulgar titles." What does he say to the following:—Giant's Tooth, Maiden, Monk, Peak of Terror, Peak of Storms, Far-water Peak, Pitchfork, Silver Pack-saddle, Lion Peak, Cathedral, Accursed Mountains, Peak of Calamity, Eagle's Rest, Horse's Tooth, Naughty Little Woman, Great Bellringer, Peak of the Three Princes, Great Venetian, Great Paradise Peak, Tower of St. Peter, Rose-garden Mountains, Crystal Mountain, Great Mules, English Ladies, Abraham's Garden, Pulpit, Three Cobblers, Emperor's Range? These are the literal translations of a few local names of mountains in the Alps, taken from the index to Mr. Bell's Alpine Guide.—W. M. Conway.]

The Ruins in Mashonaland.

3, Wells Villas, Bowes Park, London, N.
March 9th, 1893.

Dear Sir,—In Mr. Swan's letter, dated February 11th, 1893, appearing in last month's *Geographical Journal* (pp. 275 and 276), a number of the statements are inconsistent with what he himself stated previously in Mr. Bent's book ('The Ruined Cities of Mashonaland,' 1892), and in the *Proceedings* of the Royal Geographical Society, 1892.

1. Mr. Swan says ('The Ruined Cities, etc.,' p. 135): "Then its amplitude [namely, that of the sun rising at the summer solstice] will be more nearly 24°, *and a line produced in this direction from the altar* [in the Great Temple] *will pass across the doorway of the sacred enclosure.*"

But in his above-mentioned letter we find this passage (l. c. p. 275): "*I do not base my statement regarding the bearing of the rising sun at the summer solstice on the existence of the altar in the Great Temple*—which I have described in the text as merely supposititious; but on the position of the centre of the arc A K."

2. Mr. Swan further states ('The Ruined Cities, etc.,' p. 134): "The centres of the arcs seem generally to have been important points, *and altars were sometimes erected at them from which the culminations or meridian transits of stars could be observed.*" Various passages show that the "altar in the Great Temple" is one of these altars. (See 'The Ruined Cities, etc.,' pp. 143, 144, 145; and *Proceedings* R.G.S., 1892, p. 308).

Yet the letter says (l. c. p. 275): "*I do not base my statement of the observation of meridian transits of stars on the existence of the altar in the Great Temple*—which I have described in the text as merely supposititious; but on the position of the centre of the arc A K."

3. Mr. Swan explains (*Proceedings* R.G.S., 1892, p. 307): "On the walls of

their temples they constructed ornamental courses of masonry of a pattern symbolical of fertility, to receive directly the sun's rays when it was rising or setting at the summer and winter solstices, *thus marking the two great events of the solar year.*" . . . . "Along the wall over the chevron pattern were erected long slabs of stone or monoliths, *and one of these probably marked the middle of the pattern, and the others may have marked sub-divisions of the year.*"

These statements clearly refer to *mathematical considerations*, viz., to the divisions and sub-divisions of the solar year. Nevertheless, Mr. Swan remarks in his letter (l. c. p. 276): "*I do not think that the position of the patterns on the outside of the temples was fixed on mathematical considerations*, although the ends of the chevron pattern on the Great Temple happen to coincide with the points where the arcs change their radii; but I think that the purpose of this pattern *was simply to decorate* the part of the wall which faced the sun when rising at midsummer."

Moreover,

4. Mr. Swan says in his letter (l. c. p. 275) that I do not suggest any other solution. I published last year a full account of my own investigations in connection with this matter in *Petermann's Mitteilungen* (see *Geographical Journal*, Vol. I., p. 183).

5. I should be glad if Mr. Swan would publish the notes or measurements upon which his plans are based. Knowing that his original plan of the great Zimbabwe Temple was made on the scale of 20 feet to 1 inch, and seeing, on the other hand, that he measures off the distances to a limit of accuracy *of the fifth part of a foot* (see 'The Ruined Cities, etc.,' p. 134)—which corresponds to *one hundredth of an inch on his original plan*, we must know the degree of accuracy of his original measurements made at Zimbabwe before we can judge of the value of his conclusions.

6. As regards my criticism of Mr. Bent's historico-geographical remarks, I have clearly enumerated the instances in which it seems to me Mr. Bent has erred, and a glance at the 'Periplus' and the 17th chapter of the first book of Ptolemy's 'Geography' will prove that what I have said is correct to the very letter.

Yours faithfully,

HENRY SCHLICHTER.

The Editor of *The Geographical Journal.*

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1892-93.

Special Meeting, February 20th, 1893.—General R. STRACHEY, R.E., C.S.I., Vice-President, &c., in the Chair.

The Paper read was:—

"An Expedition across Tibet." By Captain H. Bower.

There was an exhibition of photographs and birds in the tea-room.

Eighth Ordinary Meeting, February 27th, 1893.—The Right Hon. Sir MOUNTSTUART E. GRANT DUFF, G.C.S.I., President, in the Chair.

ELECTIONS.—*Harold William Ansell; Hon. Henry Campbell Bruce; John Cutliffe; Alexander Jones David; Rev. Walter Hancock; Miss Julia Lindley;*

James Perkins; Major Henry Shuckburgh; Captain T. W. Stilwell (5th Northumberland Fusiliers); John Charles Marshall Taylor; Charles S. Cornish Watkins.

The Paper read was:—

"Journeys in Mongolia and Tibet." By W. Woodville Rockhill.

There was an exhibition of photographs in the tea-room.

Ninth Ordinary Meeting, March 13th, 1893.—The Right Hon. Sir MOUNTSTUART E. GRANT DUFF, G.C.S.I., President, in the Chair.

ELECTIONS.—*Claude Beddington; Herbert Melville Beddington; William John Philip Benson; Alexander Douglas Campbell; Richard John Cunninghame; Rev. Richard Percival Durnford; Miss E. Grey; Geoffrey Hastings; Colonel Edward T. H. Hutton; Captain Edward A. W. Lendy, D.S.O.; Captain F. D. Lugard; Mary Louisa O'Donoghue; Henry Owen; Hon. Sir Robert J. Pinsent, D.C.L., &c.; Robert Richardson; Captain F. M'Iver Roome; Henry B. Slee; William Cecil Slingsby.*

The Paper read was:—

"The Chatham Islands: Their Relation to a Former Southern Continent." By H. O. Forbes.

There was an exhibition of photographs, maps, and views, in the tea-room.

Erratum.—In the list of elections on February 13th the name of Mr. Charles H. J. Acret was misspelled Acreb.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

EUROPE.

Germany—Rhine. *Ann. Geog.* **2** (1893): 212–238. **Auerbach.**

Etude sur le régime at la navigation du Rhin. Par B. Auerbach.

Founded mainly on the Baden Government report, "Der Rheinstrom und seine Nebenflüsse."

Germany—Schleswig-Holstein. **Gloy.**

Beitrage zur Siedelungskunde Nordalbingiens. Von Dr. Arthur Gloy in Kiel. Stuttgart, Engelhorn, 1892: 8vo, pp. [38].

One of Kirchhoff's series of "Forschungen zur deutschen Landes- und Volkeskunde." This paper presents the facts of distribution of population in a remarkably clear and novel manner. It will be specially referred to.

Germany—White Elster. *Mitt. Verein Erdkunde Leipzig* (1891): 1–67. **Gruner.**

Beiträge zur Hydrologie der weissen Elster von Hans Gruner.

Hungary. *Bul. Soc. Hongroise Geog.* **20** (1892): ap. 25–43. **Hanusz.**

Ungarn ein Goldland. Von Stephan Hanusz.

The Hungarian original occupies pp. 97–106 of the same volume.

Hungary—Huzuls. *Ausland* **66** (1893): 17–21. **Kaindl.**

Die Huzulen. Eine Ethnographische Skizze. Von Raimund Friedrich Kaindl (Czernowitz).

Hungary—Lake Balaton. *Bul. Soc. Hongroise Geog.* **20** (1892): ap. 62–67. **Herman.**

Die Fischertopographie des Balaton (Plattensee) mit Rücksicht auf die Entheilung der Wasserfläche und Kenntniss des Seegrundes. Von Otto Herman.

The Hungarian original paper occupies pp. 218–223 of the same volume.

Iceland. *Geog. Tidskrift (Copenhagen)* **12** (1893): 36–45. **Thoroddsen.**

Om Islands geografiske og geologiske Undersögelse. Af. Th. Thoroddsen, Adjunkt i Reykjavik.

A general account of the physical geography of Iceland.

Italy—Genoa.

Notizie sulle Condizioni Industriali della provincia di Genova, con una carta stradale e industriale. Pubblicate della Direzione generale della Statistica. Roma, Bertero, 1892: 8vo, pp. 198. *Presented by Miss Cust.*

A report presented to the Italian Geographical Congress by the Statistical Department of the Italian Government.

Montenegro. **Dragovna**

Pokushai za Bibliographiju o Tsornoi Gori sastatvno Marko Dragovna. Cettinje, 1892: 8vo, pp, 64. *Presented by W. H. Cozens Hardy, Esq.*

A bibliography of Montenegro containing 460 entries.

Pyrenees. **Margerie and Schrader.**

Aperçu de la Structure Géologique des Pyrénées. Par Emm. de Margerie et Fr. Schrader. Paris, Chamerot et Renouard, 1892: 8vo, pp. 66. *Presented by the Authors.*

A complete geological study of the range, with numerous diagrams and a fine geological map on the scale of 1:800,000. The paper is reprinted from the *Annuaire* of the French Alpine Club for 1891.

Russia. **Boddy.**

With Russian Pilgrims. Being an account of a sojourn in the White Sea Monastery, and a journey by the old Trade Route from the Arctic Sea to Moscow. By Alexander A. Boddy, Vicar of All Saints, Monkwearmouth, &c., &c. Also an appendix, giving a full history of the Solovetsk Obitel, by the Venerable Archimandrite Meletii. London, Wells, Gardner, Darton & Co. *Undated* [1892 ?]. *With maps and illustrations. Price 7s. 6d. Presented by the Publishers.*

Mr. Boddy visited the monastery of Solovetsk, travelling by sea round the North Cape, and returned up the Dwina and Sachona to Vologda, and thence across to Moscow, following the old route of the Muscovy traders. The journey was planned mainly to gather information as to the Russian Church; but the book is throughout thoroughly readable, and the descriptions of places and people are interesting.

Spain. **Chapman and Buck.**

Wild Spain (España Agreste) Records of Sport with Rifle, Rod, and Gun, Natural History and Exploration. By Abel Chapman, F.Z.S., and Walter J. Buck, C.M.Z.S., of Jeres. London, Gurney and Jackson, 1893: 8vo, pp. xx. and 472. *Price 21s. Presented by the Publishers.*

An admirably written record of sport and travel, illustrated by a series of excellent sketches and photographs by the authors. While every chapter is as good of its kind as it could well be made, the most interesting geographically are those describing the Bætican Wilderness and the journey through the marisma, with its flamingoes and wild camels. It is hard to believe that regions so desert exist in Western Europe; many of the descriptions recall the scenery and fauna of Central Asia. Bull-fighting is the link between the wild Spain of the estancia where the bulls are reared, and the civilised Spain of the cities where they are gracefully slaughtered.

Switzerland—Public Works. **Salis.**

La Correction des Torrents en Suisse. Exposé raisonné d'ouvrages exécutés, rédigé par ordre du Département Fédéral de l'Intérieur par A. de Salis. Deuxième Livraison. Berne, 1892: 4to, pp. 34, Plates LII. *Presented by the Département Fédéral de l'Intérieur through Professor Paul Chaix.*

ASIA.

Asia Minor. *Sitzungsb. Akad. Wiss. Wien* **100** (*Ab. I.*) (1891): 378–399. **Bukowski.**

Kurzer Vorbericht über die Ergebnisse der in den Jahren 1890 und 1891 im südwestlichen Kleinasien durchgeführten geologischen Untersuchungen. Von Gejza Bukowski.

Another paper by this author on the geology of Balia Maaden in the north-west of Asia Minor is published in the same journal, Vol. 101 (Ab. I.), 214–236, with diagrams.

"Bassein." *Indian Antiquary* **22** (1893): 18–21. **Temple.**

The name "Bassein." By Major R. C. Temple.

Bassein in Burma has been known to Europeans as Cosmin up to 1764, then as Persaim, and since about 1800 as Bassein. Bassein in Bombay has been called by Europeans, Baxai, Baçaim, Basaïn, Bassai, and Bessi, the native name being Wasai. Bassein in Berar has for its native name Basim or Wasim.

China—Yunnan. **Pichon.**

Un Voyage au Yunnan. Par le Dr. Louis Pichon. Paris, Plon Nourrit et Cie.: 1893: 8vo, pp. viii. and 286. *Map. Price 3 fr. 50 c.*

Dr. Pichon travelled from Hanoi up the Red River to the southern part of the Yunnan Province.

Dutch East Indies. **Van der Chijs.**

Nederlandsch-Indisch Plakaatboek, 1602–1811. Door Mr. J. A. Van der Chijs. Tiende Deel, 1776–1787. Batavia; 's Hage, M. Nijhoff, 1892: 8vo, pp. 1073.

India. *Journ. Soc. Arts.* **41** (1893): 329–345. **Hunter.**

The Progress of India under the Crown. By Sir William Wilson Hunter.

The modern system for the internal defence of India is briefly explained, and the advance of commerce described. The paper is followed by a discussion.

India—The Mihran. **Raverty.**

The Mihran of Sind and its Tributaries: a Geographical and Historical Study. By Major H. G. Raverty, Bombay Army (Retired). 8vo. *Reprinted from Journal of the Asiatic Society of Bengal* **61** (1892): pp. 155–220. *Presented by the Author.*

Major Raverty has sent to the Society a revised and annotated copy of his paper, which will be referred to elsewhere.

India—The Saraswati. *Journ. Roy. Asiat. Soc.* (1893): 49–176. **Oldham.**

The Saraswati and the Lost River of the Indian Desert. By Surgeon-Major C. F. Oldham. *With map.*

This paper will be noticed elsewhere.

Japan. **Milne and Burton.**

The Volcanoes of Japan. Part I. Fujisan. By John Milne, F.R.S., and W. K. Burton. Collotypes by K. Ogawa. *Printed at the Tokyo Tsukiji Type Foundry.* Not dated [1892]. *Price 21s.*

Ten large photographs of Fujisan, very finely reproduced, with a few pages of descriptive letterpress, make up the first part of what promises to be a work of value.

Java—Industries. *Tijd. Indische Taal-Land-Volkenkunde* **36** (1892): 1–112. **Does.**

Toestand der Nijverheid in de afdeeling Bandjarnegara. Door A. M. K. de Does. *With illustrations.*

Pisidia. **Lanckoronski and others.**

Les Villes de la Pamphylie et de la Pisidie: Ouvrage publié avec le concours de G. Niemann et E. Petersen. Par le Comte Charles Lanckoronski. Tome second, avec 3 planches en couleurs, 33 heliogravures et 154 illustrations de texte. Paris, Firmin-Didot et Cie., 1893. Large 4to, pp. (text) 260. *Price 100s.*

Siberia. **Marsden.**

On Sledge and Horseback to Outcast Siberian Lepers. Illustrated from photgraphs and drawings. By Kate Marsden. London, Record Press, *not dated* (1893?): 8vo, pp. xvi. and 244. *Price* 6*s*.

A lively account of the hardships of a sledge journey to Irkutsk and Yakutsk along the usual highway and the Lena, followed by a 2000 miles' journey on horseback from Yakutsk to the leper *yurtas* in Srednie-Viluisk. The account is quite correct, without any tendency to sensationalism or exaggeration. The description of a forest land on fire, not when the trees but the whole peat soil is burning, is very good and makes a valuable addition to the description of the scenery of Siberia. On reaching the end of this book one feels relieved to learn that the unhappy lepers who were abandoned to themselves in a few *yurtas* amidst the most unaccessible forests, will ultimately be relieved by the erection of a suitable hospital.—[**P.K.**]

AFRICA.

African Fortifications. *Globus* **63** (1893): 133–142. **Hösel.**

Ueber das Befestigungswesen in Afrika. Von Dr. L. Hösel, Leipzig.

An interesting summary with several illustrations.

British East Africa. *Scot. Geog. Mag.* **9** (1893): 113–126. **Dundas.**

Exploration of the Rivers Tana and Juba. By Commander F. G. Dundas, R.N.

Egypt. **Milner.**

England in Egypt. By Alfred Milner, late Under-Secretary for Finance in Egypt. Second edition. London, Edward Arnold, 1893: 8vo, pp. vii.; and 448. *Price* 16*s*.

Mr. Milner's record of the work accomplished by the British occupation of Egypt is a standard whereby the actual state of the country during his years of service there may be compared with its past history and its future development.

German East Africa. *Mitt. Deutsch. Schutzgebieten* **6** (1893): 42–60. **Behr.**

Die Wakua-Steppe. Von H. F. v. Behr.

A journey from Lindi for the exploration of the country lying between the Rovuma and the Wakwa Steppe.

Kalahari. *Mitt. Deutsch. Schutzgebieten* **6** (1893): 25–39. **Fleck.**

Bericht des Dr. Fleck über seine Reise durch die Kalahari zum Ngami-See. *With map.*

Madagascar. ———

The Antananarivo Annual and Madagascar Magazine. No. XVI., Christmas, 1892. Antananarivo: printed at the Press of the London Missionary Society. *Presented by the Rev. J. Sibree.*

This number contains several short articles of some geographical interest, including one by Rev. R. Baron on a journey of 1200 miles to the north-east and north-west coasts of the island, one by Mr. Thomas Lord on a journey to the south-east of the island, and a series of contributions to the natural history and anthropology of Madagascar.

Madagascar. *Scot. Geog. Mag.* **9** (1893): 127–141. **Savoureux**

Madagascar. By M. Joël le Savoureux.

M. Savoureux resided for several years in the island, and describes it from the French point of view.

Mountain Flora. **Engler**

Ueber die Hochgebirgsflora des tropischen Afrika von A. Engler. Aus den Abhandlungen der königl. Preuss. Akademie der Wissenschaften zu Berlin vom Jahre 1891. Berlin, 1892: 4to, pp. 462. *Presented by the Author.*

South Africa.

Letters from South Africa. By *The Times* Special Correspondent. Reprinted from *The Times* of July, August, September, and October, 1892. London, Macmillan & Co., 1893: cr. 8vo, pp. 116. *Price* 2*s.* 6*d. Presented by the Publishers.*

These letters convey a good impression of the present condition of South Africa.

Sudan—Travels. *Compte Rendus Geog. Soc. Paris* (1893): 53–82.

Reception du Commandant Monteil.

Report of the special meeting of the Paris Geographical Society in honour of M. Monteil's journey in the Sudan and across the Sahara.

Uganda. *Church Mission. Intelligencer* **44** (1893): 196–204. **Walker.**

Notes on Uganda. By the Rev. R. H. Walker.

A useful plan of Mengo, and a sketch-map showing the territorial divisions of Uganda accompanying the paper.

West Africa. **Brosselard-Faidherbe.**

Capitaine Brosselard-Faidherbe. Casamance et Mellacorée. Pénétration au Soudan. Paris, 4to, pp. 106, *maps and illustrations. Price* 3 *francs.*

Zambesi. **Rankin.**

The Discovery of the Chinde Entrance to the Zambesi River. By Daniel J. Rankin. Roy. 8vo, pp. [6]. *From the 'Fortnightly Review,' December* 1892.

NORTH AMERICA.

Alaska. **Egerton.**

Alaska and its Glaciers. By Lady Grey Egerton. Roy. 8vo, pp. [11]. *From the 'Nineteenth Century,' December* 1892.

America. **Cronau.**

Amerika. Die Geschichte seiner Entdeckung von der ältesten bis auf die neueste Zeit. Eine Festschrift zur 400-jahrigen Jubelfeier der Entdeckung Amerikas durch Christoph Columbus. Verfant und illustriert von Rudolf Cronau. Leipzig, Übel und Müller, 1892: 2 vols., 4to, pp. I. 480, II. 532. *Price* 24 *marks.*

These large and handsome volumes are profusely illustrated with maps and views. They give in moderate compass a sketch of all that is known regarding America from the oldest geological time, through the prehistoric period, and down to the present day.

Historical. **Atkins.**

Indian Wars and the Uprising of 1655—Yonkers Depopulated. A paper read before the Yonkers Historical and Library Association. By Hon. T. Astley Atkins, March 18th, 1892. Yonkers, 1892: large 8vo, pp. 14. *Presented by G. B. Balch, M.D., Librarian of the Association.*

United States—Minnesota. **Winchell.**

The Geological and Natural History Survey of Minnesota. The Nineteenth Annual Report for the year 1890. H. N. Winchell, State Geologist. Minneapolis, 1892: 8vo, pp. 256.

The report includes translation of a paper on "Geognostic and Geographic Observations in the State of Minnesota," by Dr. J. H. Kloos, pp. 81–121, and a memoir on "The Woods of Minnesota," by H. B. Ayres, pp. 128–137.

CENTRAL AND SOUTH AMERICA.

Argentine. **Gastrell.**

Argentine Republic. Report for the year 1892 on the General Condition of the Argentine Republic. [By Vice-Consul William S. H. Gastrell.] No. 1147 Diplomatic and Consular Reports on Trade and Finance. Foreign Office, 1893. London: 8vo, pp. 120. *Printed for Her Majesty's Stationery Office. Price* 6*d.*

British Guiana. **Im Thurn.**

Notes on British Guiana. By E. F. Im Thurn, M.A., C.M.G. A paper read before the Royal Colonial Institute, December 13th, 1892: 8vo, pp. 32.

An epitome of the present condition of the Colony of British Guiana.

British Honduras. **Knollys.**

British Honduras: Outlines of its Geography. By Reginald J. Knollys. London, National Society's Depository: 12mo, pp. 56. *Presented by the Author.*

Compiled for use in the schools of the colony.

La Plata. *Bull. American Geog. Soc.* **24** (1892): 479–509. **Morong.**

The Rio de La Plata: Its Basin, Geography, and Inhabitants. By Thomas Morong.

A popular lecture delivered to the American Geographical Society giving an account of a voyage up the Rio de la Plata.

Nicaragua. *Pet. Mitt.* **39** (1893): 25–39. **Mierisch.**

Eine Reise nach den Goldgebieten im Osten von Nicaragua. Im Auftrage der nicaraguanischen Regierung ausgeführt im Jahre 1892. Von Dr. Br. Mierisch.

This paper will be specially noticed.

AUSTRALASIA AND PACIFIC ISLANDS.

Australian Handbook. **Gordon and Gotch.**

The Australian Handbook (incorporating New Zealand, Fiji, and New Guinea). Shippers and Importers' Directory and Business Guide for 1893. Twenty-fourth year of issue. London, Gordon & Gotch, 1893: Roy. 8vo, pp. 608. *Numerous maps and plans.*

This work includes the most complete and best-edited gazetteer of Australasia.

Hawaii—Kilauea. *American Journ. Sci.* **45** (1893): 241–246. **Dodge.**

Kilauea in August 1892. By Frank S. Dodge.

Exact measurements of the crater, compared with the survey of 1888.

New South Wales. *Records Geol. Surv. N.S.W.* **3** (1892): 68–70. **Etheridge.**

Report on a visit to the Narrangullen, or Cavan Cave, Taemas, Murrumbidgee River. By R. Etheridge, Junr. *With a plate.*

New Zealand. **Perceval.**

New Zealand. By Westby Brook Perceval. A paper read before the Royal Colonial Institute, May 10th, 1892: 8vo, pp. 40. *Presented by the Agent-General for New Zealand.*

A statement of the prosperity and progressiveness of the colony.

Western Australia. **Calvert.**

Western Australia and its Gold Fields. By Albert F. Calvert. With Government Map. London, G. Philip & Son, 1893: 12mo, pp. 61. *Price* 1*s. Presented by the Publishers.*

Deals with the geography, resources, climate, &c., of Western Australia.

POLAR REGIONS.

Arctic Exploration. **Keely and Davis.**

In Arctic Seas. The Voyage of the *Kite*, with the Peary Expedition; together with a transcript of the log of the *Kite*. By Robert N. Keely, Jun., M.D., and G. G. Davis, A.M., M.D. Illustrated with maps, portraits, and photographic views. London, Gay & Bird, 1893: sq. 8vo, pp. viii. and 524. *Price* 18*s.*

The voyages of the *Kite* with Peary to the Greenland Coast in 1891, and to the Greenland Coast for Peary in 1892, are described, with many illustrations.

Greenland. *Bull. American Geog. Soc.* **24** (1892): 536–558. **Peary.**

The North Greenland Expedition of 1891-92. An address by Civil Engineer R. E. Peary, U.S.N. *With illustrations.*

Greenland. **Poussin.**

Les Voyages d'Exploration sur l'Inlandsis du Groenland. Par J. de la Vallée Poussin. Bruxelles, 1893: 8vo, pp. 46. *Reprinted from the Revue des questions scientifiques, January,* 1893. *Presented by the Author.*

Notes on the various attempts to explore the Inland Ice of Greenland.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Air and Sea Temperature *Pet. Mitt.* **39** (1893): 39–44. **Zenker.**

Die gesetzmässige Verteilung der Lufttemperaturen über dem Meere. Von Dr. W. Zenker.

Earth's History. **Roberts.**

The Earth's History, an Introduction to Modern Geology. By R. D. Roberts, M.A., D.SC. London, John Murray, 1893: 8vo, pp. xxiv. and 270. *Maps and illustrations. Price 5s. Presented by the Publisher.*

In this volume of Murray's University Extension Manuals Dr. Roberts gives an account of the evolution of terrestrial features, and the system of waste and repair that is continually in operation. It is a well-planned epitome, making no attempt to be exhaustive, but laying down all the main lines of scientific thought, along which a student, stimulated by reading these attractive chapters may advance to the more detailed study of geology.

Islands. *Natural Science* **2** (1893): 188–194. **Jukes-Browne.**

The origin and Classification of Islands. By A. J. Jukes Browne; with a note by Alfred Russel Wallace, LL.D.

Magnetic Conditions. *Sitzungsb. Akad. Wiss. Wien* **101** (*Ab. IIa.*) (1892): 142–157. **Liznar.**

Ueber die Bestimmung der bei den Variationen des Erdmagnetismus auftretenden ablenkenden Kraft, nebst einem Beitrage zur elfjährigen Periode des Erd-magnetismus (vorläufige Mittheilung). Von J. Liznar. *Illustrations.*

See also a paper by the same author in Vol. 100 (Ab. IIa.), 1153–1165.

Marine Research, Mediterranean.

Berichte der Commission für Erforschung des Oestlichen Mittelmeeres. Erste Reihe. Vienna. Published by the Kaiserlich Akademie der Wissenschaften. Not dated [1893?] 4to, pp. 112. *Numerous maps and illustrations. Presented by the Academy.*

Captain W. Mörth gives an account of the Austrian surveying ship *Pola* and her equipment for deep-sea research. Professor J. Luksch describes the physical observations made on the *Pola* during the two cruises of 1890 and 1891, and Dr. K. Natterer discusses the chemical work of the expeditions. The illustrations include special bathygraphical charts, and temperature curves and sections.

Mediterranean *Sitzungsb. Akad. Wiss. Wien* **100** (*Ab. IIa.*) (1891): 927–935. **Luksch.**

Veröffentlichungen der Commission für Erforschung des östlichen Mittelmeeres. Vorläufige Bericht über Lothungen und physikalische Beobachtungen im Sommer 1891. Von J. Luksch.

The physical work of the *Pola* expedition. With map of route.

Ocean Depths. *Natural Science* **2** (1893): 180–187. **Suess.**

Are Great Ocean Depths Permanent? By Professor Edward Suess, PH.D.

Professor Suess sums up the recent controversy on this subject in the words, "I see no reason why parts of the ocean, or even of the dry land, may not to-morrow sink to form new depths, or why we should believe that all the great ocean basins have been continuously covered by water since panthalassic times. But all this is unripe fruit. Our scholars will some day know more than their masters do now, so let us patiently continue our work and remain friends."

Ordnance Survey.

Report of the Departmental Committee, appointed by the Board of Agriculture, to inquire into the Present Condition of the Ordnance Survey; with copy of the minute appointing the Committee. London. *Printed for H.M. Stationery Office*, by Eyre and Spottiswoode, 1893: 4to, pp. xiii. *Price* 4½*d.*

Photographic Surveying. **Reed.**

Photography applied to Surveying. By Lieut. Henry A. Reed, U.S. Army. Second edition. New York, Wiley & Sons, 1889; 4to, pp. 68. *Plates and other illustrations.*

Position at Sea. *Sitzungsb. Akad. Wiss. Wien* **101** (*Ab. IIa.*) (1892): 205–213. **Gelcich.**

Die Bestimmung der geographischen Schiffsposition in dem sogenannten kritischen Falle. Von Eugen Gelcich. *Illustrations.*

Winds. **Thomson.**

On the Grand Currents of Atmospheric Circulation. By J. Thomson, LL.D., F.R.S. (The Bakerian Lecture, 1892). London, Published for the Royal Society, by Kegan Paul, Trench, Trübner & Co, 1891: Roy. 4to, pp. 653–684. *Price* 1*s.* 6*d. Presented by the Royal Society.*

Zones of the Earth. *Bol. Soc. Geog. Italiana* **6** (1893): 40–51. **Minutilli.**

La Variazione delle zone terrestri. Nota del socio prof. Federigo Minutilli.

Historical notes on the division of the Earth's surface into zones of climate.

GENERAL.

Biography—Bates. **Allen.**

Bates of the Amazons. By Grant Allen. Roy. 8vo, pp. 12. *From the 'Fortnightly Review,' for December*, 1892.

Biography—Beccari. *Deutsche Rundschau* **15** (1893): 277–279. **Miessler.**

Odoardo Beccari. Von Adolf Miessler. *With portrait.*

Biography—Keleti. *Deutsche Rundschau* **15** (1893): 279–282. **Paloczy.**

Karl Keleti. Von Prof. L. Paloczy. *With portrait.*

British Colonies. **Hughes and Williams.**

The Geography of the British Colonies and Dependencies, Physical, Political, Commercial. By William Hughes and J. Francon Williams. London, G. Philip & Son, 1892: sm. 8vo, pp. viii and 232, *map. Price* 2*s.* 6*d. Presented by the Publishers.*

French Colonies. **Rambaud.**

La France coloniale, Histoire—Géographie—Commerce. Par Alfred Rambaud avec la collaboration d'une Société de Géographes et de Voyageurs. Sixiéme edition. Paris, Armand Colin et Cie., 1893: 8vo, pp. vi. and 792. *Maps. Price* 8 *francs.*

A concise and authentic epitome of French colonial history, and of the geographical and commercial conditions of the existing colonies. The various departments of the subject are treated by responsible contributors whose articles are signed, and the work is easy of reference.

General. **Allen.**

Science in Arcady. By Grant Allen. London, Lawrence and Bullen, 1892: 8vo, pp. 304. *Price*, 5*s.*

Contains several papers on the relations of physical and historical geography in a thoroughly popular form, but showing true appreciations of geographical principles.

German Colonies. **Meinecke.**

Koloniales Jahrbuch. Herausgegeben von Gustav Meinecke, Vierter Jahrgang. Das Jahr 1891. Berlin, Carl Heymanns, 1892: large 8vo, pp. 335, *maps and illustrations.*

Historical Geography. **M'Clymont.**

The Influence of Spanish and Portuguese Discoveries during the first twenty years of the Sixteenth Century on the Theory of an Antipodeal Southern Continent. By James R. M'Clymont, M.A. Extracted from the Report of the Fourth Meeting of the Australasian Association for the Advancement of Science: 1892: 8vo, pp. 24. *Presented by the Author.*

Historical Geography—America. ———

Hamburgsche Festschrift zur Erinnerung an die Entdeckung Amerika's, herausgegeben vom wissenschaftlichen Ausschuss des Komités für die Amerika-Feier. Hamburg Friederichsen & Co., 1892: 4to, 2 vols., articles separately paged. *Maps. Price* 20 *marks.*

The first volume contains papers by Dr. Ruge on the history of Geographical Discovery in the New World, pp. 132; by E. Gelcich on Nautical Instruments and Appliances of the 16th century, pp. 90; by Dr. E. Baasch on the history of the Commercial Relations between Hamburg and America, pp. 256; and by Dr. H. Michow on Caspar Vopell, pp. 22. Vol. II. is occupied by an account by Herm. A. Schumacher of the adventures of the Augsburg merchant Welser and others in Venezuela, and of Juan de Castellanos, pp. 328; and by L. Friedrichsen on Sir Walter Ralegh's map of Guiana, pp. 9. (See *Geog. Journ.* 1, p. 167.)

Travel. **Perkins.**

A Tour Round the Globe. Letters to the *City Press.* By James Perkins, C.C. London, W. H. & L. Collingridge, 1891: 12mo, pp. 76. *Presented by the Author.*

Year Book. **Bonney.**

The Year Book of Science. Edited for 1892 by Professor T. G. Bonney, D.SC., LL.D., F.R.S. London, Cassell & Co., 1893: 8vo, pp. viii. and 520. *Price* 7*s.* 6*d. Presented by the Publishers.*

Of the value of such a year book as this there can be no doubt. It is, however, to be regretted that the section on "Physical Geology and Geography" by Professor Seeley occupies only sixteen pages. Under the head of "recent exploration" St. George Littledale's journey across the Pamirs and Peary's in Greenland alone are mentioned. By a printer's error the former journey is credited to "Sir George" Littledale. Rockhill's journey in Tibet, Conway's in the Karakoram, Diener's in the Central Himalaya, and all the work of African travellers, is passed over. In physical geography proper there are serious omissions. James Geikie's and Lapworth's masterly addresses to the British Association are passed over in silence, the monumental *Challenger* volume on Oceanic Deposits is not referred to under any heading. The Russian work on the Black Sea, the Austrian work on the Mediterranean, the United States Coast Survey work on the Gulf Stream, the Prince of Monaco's chart of Atlantic currents, Petterson's work on the Baltic, and the Scottish Marine Station's work on the Clyde Sea Area, all published long before the end of 1892, are not mentioned. One-third of the whole space is given to glaciers and glacial phenomena; but Drygalski's work on the Greenland glaciers is not noted, nor is the Savoy disaster referred to. The publication of the last parts of Berghaus's great physical atlas also pass unnoticed All the other departments of geology and most of the other sciences are very well epitomised, so far as the necessarily contracted limits of the work admit.

Year Book. **Keltie.**

The Statesman's Year Book, Statistical and Historical Annual of the States of the World for the year 1893. Edited by J. Scott Keltie. Thirtieth Annual Publication. London, Macmillan & Co., 1893: pp. xxxvi. and 1152, *maps. Price* 10*s.* 6*d. Presented by the Publishers.*

The new and special features of this issue are a small but remarkably clear map of the Pamirs, a map, somewhat highly coloured, of Africa south of the equator showing territorial divisions, and a series of ten statistical tables giving a list of the great cities of the world with population, a summary of the wheat crops of the world, the total production of gold and silver, the external trade of Africa, and the trade of the British Empire. The statistics of the countries of the world have been revised and brought down to the latest date possible.

NEW MAPS.

By J. COLES, *Map Curator*, R.G.S.

EUROPE.

Eastern Alps. **Freytag.**

Karte des Sonnblick und Umgebung von Gustav Freytag. Scale 1 : 50,000, or 1·4 inch to a geographical mile. Kartogr. Anst. v. G. Freytag & Berndt, Wien. *Presented by the Publishers.*

England and Wales. **Ordnance Survey.**

Publications issued since February 12th, 1893.

1-inch—New Series:—

ENGLAND AND WALES: 301, engraved, hills shaded, 256–270, 344, 345, hills shaded black or brown, 1*s.* each.

6-inch—County Maps:—

ENGLAND AND WALES: **Yorkshire**, CIV. S.W., CX. S.W., CXX. S.W., CLXIII. S.W., CCXIX. N.E., CCLXXXIX. N.E., CCXCVI. N.E., 1*s.* each.

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ENGLAND AND WALES: **Oldham** (Lancashire), LXXXIX. **15**, 11, 3*s.*; 14, 2*s.* 6*d.*; 16, 3*s.*; 17, 18, 19, 21, 3*s.* each; 23, 4*s.*; 24, 3*s.*; 25, 3*s.*; LXXXIX. **16**, 16, 21, 3*s.* each; XCVII. **6**, 14, 11*s.* 6*d.* **Knottingley** (Yorkshire), CCXXXV. **10**, 22, 4*s.*; CCXXXV. **14**, 4, 8, 5*s.* each; 9, 4*s.* (coloured). This town is now complete in 8 sheets. Index, 2*d.* **St. Helens** (Lancashire), CVIII. **1**, 9, 4*s.*; 14, 5*s.*; 18, 4*s.* **Whitby** (Yorkshire), XXXII. **3**, 21, 4*s.*; 22, 3*s.*; XXXII. **7**, 1, 4*s.*; 2, 5*s.*; 11, 4*s.* (coloured). Index, 2*d.*

(*E. Stanford, Agent.*)

France. **Delebecque.**

Atlas des Lacs Français, par A. Delebecque, Ingénieur des Ponts et Chaussées, Département de la Haute-Savoie. Publié sous les auspices du Ministère des Travaux Publics. *Presented by the Author.*

This is the first part of an important atlas of the French lakes, containing seven maps. The depths are shown in different shades of blue, and by contour lines for every change of five metres, the places where the soundings were taken being indicated by dots The maps in the present issue are:—Lac Leman, on the scale of 1 : 50,000; Lac du Bourget, scale, 1 : 20,000; Lac D'Annecy, scale, 1 : 20,000; Lac D'Aaiguebelette, scale, 1 : 10,000; Lac de Paladru, scale, 1 : 10,000; and the two remaining sheets contain maps of Lacs de St. Point, Remoray, Brenets, Malpas, Nantua, Genin, and Sylans, all on the scale of 1 : 10,000. On each sheet the latitude, longitude, level, and area of the lake is given, together with the date on which the survey was made. It is the intention of the publishers to complete this atlas during the present year, and it will form a valuable addition to our knowledge of the inland hydrography of Europe, a subject which, both in our own and other countries, does not at present receive the attention it deserves.

Italy. **Fritzsche**

Carta Politica Speciale del Regno d'Italia, colla indicazione delle Circoscrizioni Amministrative (Compreso quelle dei singoli Comuni) e delle Nuove Circoscrizioni dei Mandamenti e dei Collegi Elettorali e colle Tabelle di altre importanti Circoscrizioni Territoriale. Scale 1:500,000, or 6·8 geographical miles to an inch. Costruita e disegnata da G. E. Fritzsche su dati riveduti da L. Grimaldi Casta della Direzione Generale di Statistica. Dedicata al Commre. Luigi Bodio Direttore Generale della Statistica del Regno. Eseguita e pubblicata dall' Istituto Cartografico Italiano, Roma, 1893. 20 sheets. *Price, 16 sheets at L. 3, and 4 at L. 1·50.*

As its title would indicate, this map shows all the political divisions of Italy. It is very clearly drawn, is printed in colours, and, quite independent of its primary object, is an extremely useful map for general reference with regard to means of communication, all railways and main roads being laid down. On sheet 3 an index-map is given, showing the area included in each sheet. Notes explaining the conventional signs, the character used in the lettering, and the abbreviations are given on each sheet, together with other notes on such subjects as commerce, politics, &c. Taken as a whole, the map is an excellent specimen of this class of cartography, the colours are well chosen, and the lettering remarkably clear.

AMERICA.

Guatemala. **Sapper.**

Karte der Verbreitung der Sprachen in Guatemala um's Jahr, 1892. Von Dr. K. Sapper. Scale 1:2,000,000, or 27 geographical miles to an inch. *Petermann's Geographische Mitteilungen*, Jahrgang 1893. Taf. 1. Gotha, Justus Perthes. *Presented by the Publisher.*

Nicaragua. **Mierisch.**

Die Goldminen-Distrikte in den Flussgebieten Prinzapolca und Cucubaia im östlichen Nicaragua. Auf Befehl Sr. Exc. des Präsidenten Dr. Roberto Sacasa, aufgenommen und gezeichnet von Dr. Bruno Mierisch. Scale 1:700,000, or 9·5 geographical miles to an inch. *Petermann's Geographische Mitteilungen*, 1883. Taf. 3. Gotha, Justus Perthes. *Presented by the Publisher.*

Patagonia. **Siemiradzki.**

Original-Karte des Limay-gebietes in Nordwest-Patagonien. Nach eigenen Aufnahmen entworfen und gezeichnet von Dr. Josef v. Siemiradzki, 1891.—Der südliche Teil der Pampa Central. Nach den Aufnahmen von Dr. Josef v. Siemiradzki, 1891. Scale 1:1,000,000, or 13·6 geographical miles to an inch. *Petermann's Geographische Mitteilungen.* Jahrgang 1893. Tafel 5. Gotha, Justus Perthes. *Presented by the Publisher.*

United States. **Blanchard.**

Map of Washington and Oregon, published by Rufus Blanchard, Chicago, 1891. Scale 1:1,480,000, or 20·3 geographical miles to an inch. *Presented by the Publisher.*

This is a useful map of the States of Washington and Oregon, on which all means of communication are laid down. It is also furnished with an alphabetical index of the names of all the towns. It contains, as insets, a chart of the Ocean Steamship routes of the World; and a facsimile of a map of Pujet Sound, as explored by Juan de Fuca in 1792.

GENERAL.

Ancient World. **Kiepert.**

Twelve Maps of the Ancient World, for Schools and Colleges, by Dr. Henry Kiepert. Berlin, Dietrich Reimer (Hoefer and Vohsen). 11th edition, improved, corrected, and enlarged. London, Williams & Norgate. *Presented by Messrs. Williams and Norgate.*

This atlas has now reached its eleventh edition, and contains the following maps:—Orbis terrarum antiquis notus; Imperia Persarum et Macedonum; Aegyptus-Phoenice

et Palaestina; Asia citerior; Graecia cum insulis et oris maris Aegaei; Graecia ampliore modulo descripta; Italia; Italiae pars media; Roma urbs; Hispania, Mauretania, et Africa; Gallia, Britannia, Germania; Imperium Romanum. In addition to these, numerous inset maps and plans are given.

German Colonies. **Kiepert and Partsch.**

Deutscher Kolonial-Atlas für den amtlichen Gebrauch in den Schutzgebieten. Nach den neuesten Quellen, mit Verwendung von kartographischem und sonstigem, bisher noch nicht veröffentlichtem, Material der Kolonial-Abteilung des Auswärtigen Amts und der Neu-Guinea-Compagnie, bearbeitet von Richard Kiepert. Begleitender Text von Dr. Joseph Partsch, Professor an der Universität zu Breslau. Mit Quellen- und Konstruktions-Notizen, sowie mit einem vollständigen Namen-Verzeichnis zu jeder Karte. Berlin, 1893. Geographische Verlagshandlung Dietrich Reimer. Inhaber, Hoefer & Vohsen. *Price* 18 *Marks. Presented by the Publishers.*

The World. **Hauer.**

Facsimile, in gores, of the silver globe presented to Gustavus Adolphus in 1632, now in the National Museum, Stockholm. By Johann Hauer, 1620. *Presented by Baron A. E. Nordenskiöld.*

This map, which has been presented to the Society by Baron Nordenskiöld, is a facsimile reproduction, in gores, of the actual size of the silver globe which was presented to Gustavus Adolphus in 1632, and which is now in the National Museum at Stockholm. Generally speaking the geography is much the same as that shown in the Hondius edition of Mercator, and the early editions of Blaeu, De Wit, and others of about this date. The inscription on the map shows that it was the work of Johann Hauer in 1620. It contains many notes in Latin on the different countries represented, and, as is usual with maps of that period, contains numerous pictures of marine monsters and ships. As a specimen of reproduction from an old globe, it is in every respect satisfactory, and the lettering, though necessarily small, is remarkably clear.

PHOTOGRAPHS.

West Africa. **Halligey.**

One Hundred Photographs of Gold Coast, Yoruba Country, etc., by Rev. J. T. F. Halligey. *Presented by Rev. J. T. F. Halligey.*

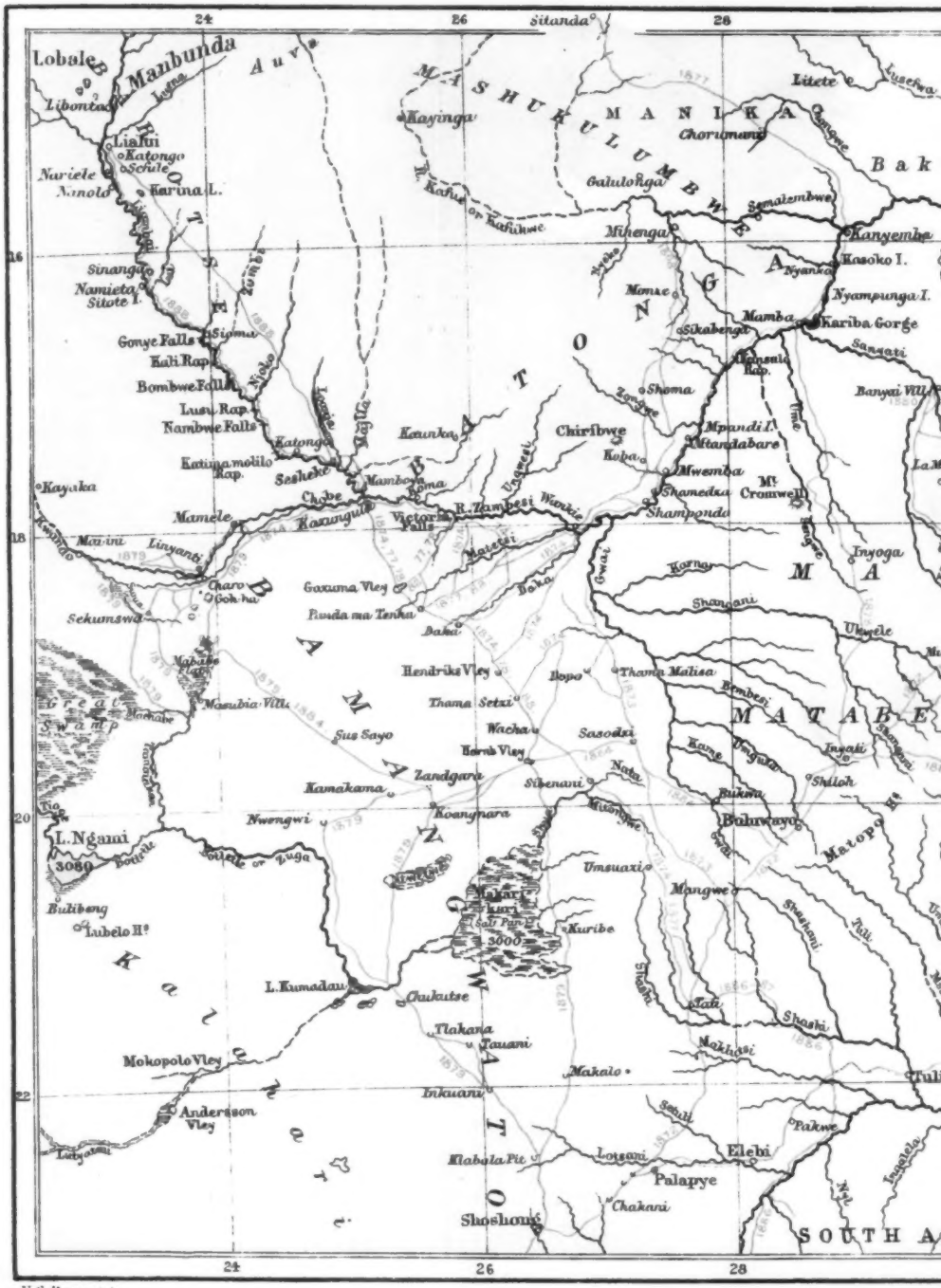
This set of photographs was taken by the Rev. J. T. F. Halligey during his travels on the West Coast of Africa and the Yoruba Country. They have been carefully selected, and illustrate the scenery and some of the remarkable features of the country. They are also of value as showing the types of natives, their dwellings and strongholds. Considering the difficulties under which many of these photographs must have been taken, they are remarkably fine specimens.

Victoria Falls. **Fry.**

Thirty-seven Photographs of the Victoria Falls and Zambesi River, taken by W. Ellerton Fry, Esq. *Presented by W. Ellerton Fry, Esq.*

This is an important series of views of the Victoria Falls of the Zambesi, and the river in their vicinity. These photographs are all the more valuable as they are accompanied by a manuscript map indicating the points from which they were taken. They are very good specimens of photography, and give an excellent idea of the remarkable physical features of this locality.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.



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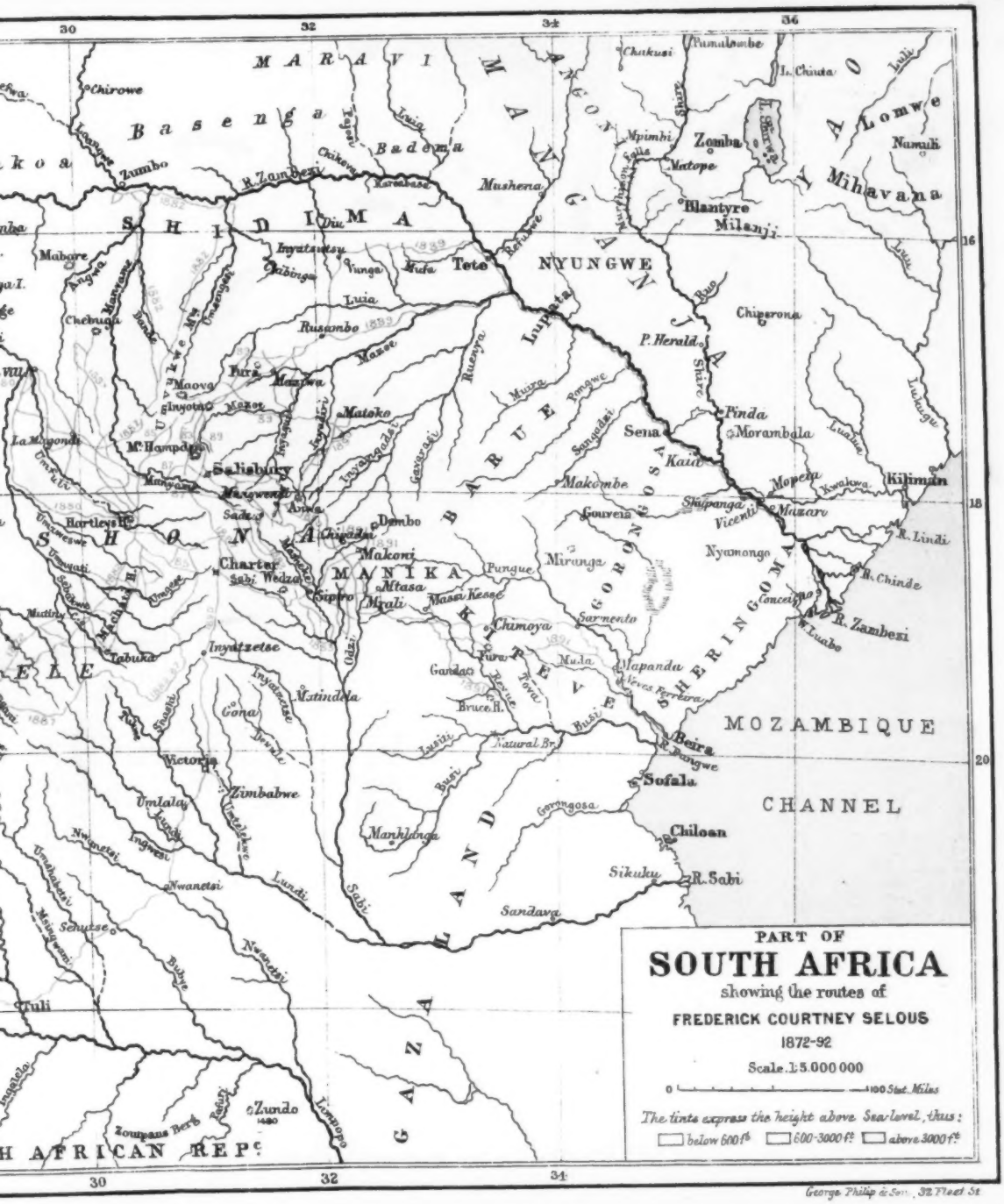

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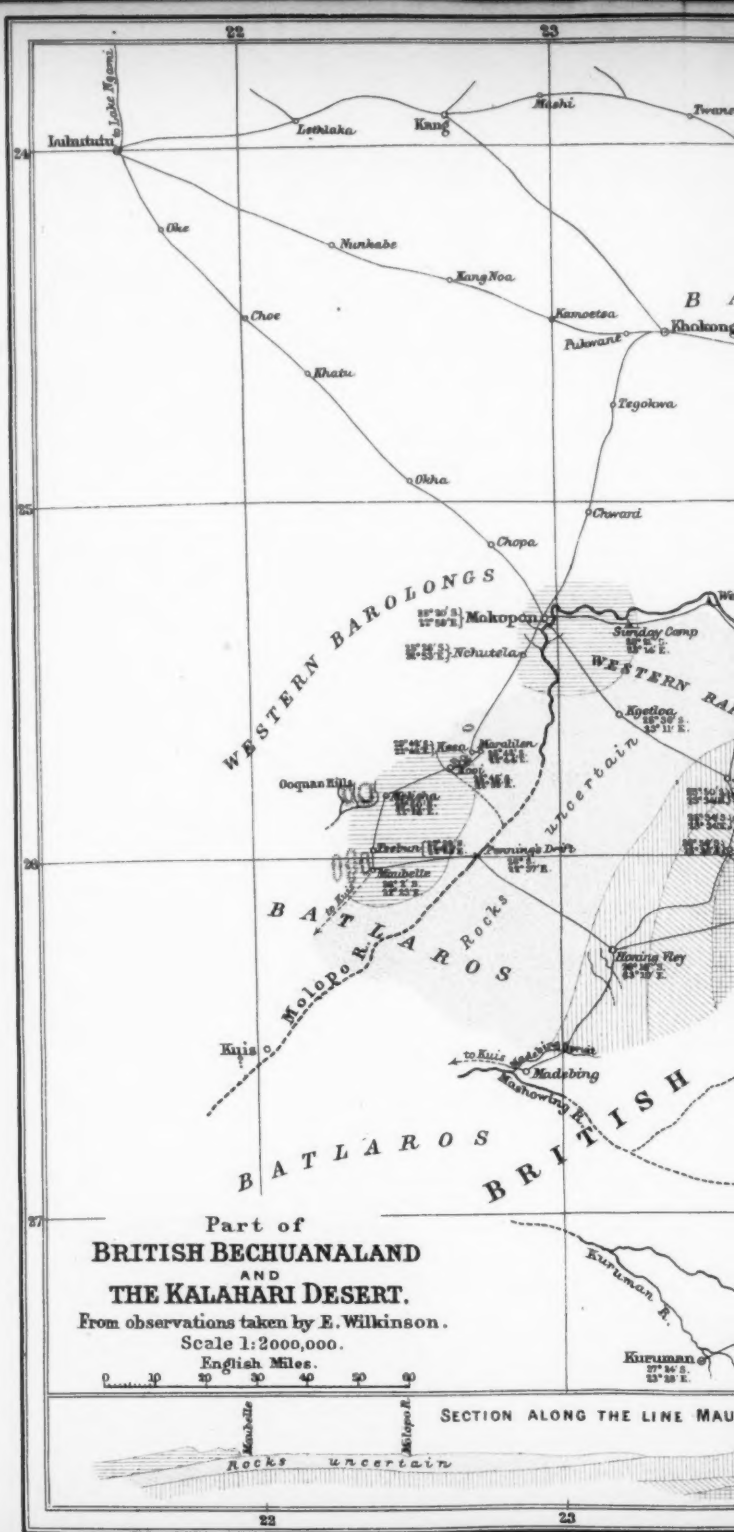

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